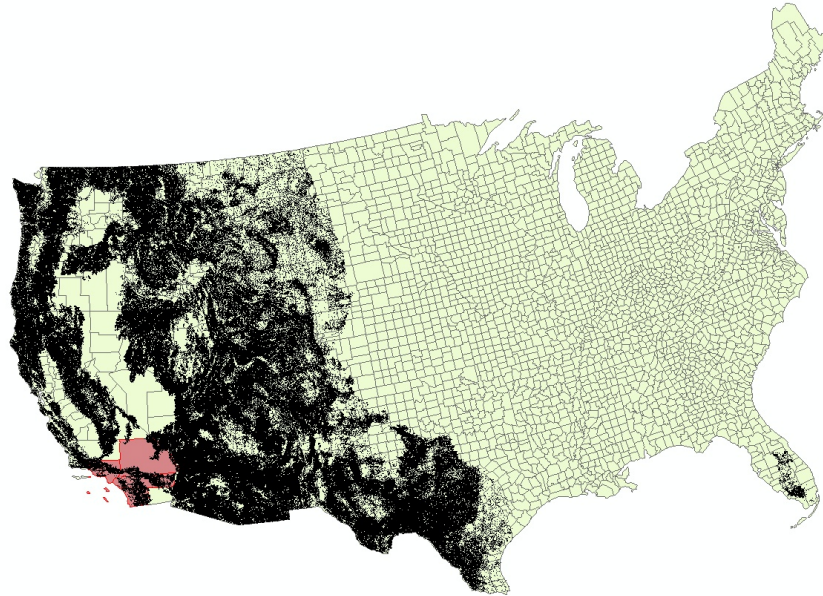


# The Human-Animal Conflict: Conservation of the Mountain Lion in Urbanizing Southern California



The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land.

This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter down river. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic of course cannot prevent the alteration, management, and use of these 'resources,' but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state.

-Aldo Leopold

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## **Abstract**

This paper explores the human-animal conflict in Southern California – evaluating the successes and failures of Proposition 117, or The California Wildlife Protection Act of 1990, in terms of conservation of the mountain lion. The mountain lion functions as an important flagship, umbrella and keystone species for conservation biology, making its conservation particularly important. Due to impending climate change, urbanization and loss of suitable land, the human-animal conflict will increase globally. Although California is relatively progressive in terms of enacting conservation strategy, the construction of the policy in 1990 has resulted in conditions that continue to encumber successful mountain lion conservation in the region today. The Act listed the mountain lion as a “specially protected mammal” and created a Habitat Conservation Fund to acquire land to be protected and managed for conservation. Mountain lion populations experience both morbidity and mortality in urbanized Southern California today. I sought to understand how Proposition 117 exacerbated the human-animal conflict in Southern California, using a mixed methods approach including interviews, spatial analysis, policy analysis, and data analysis. I found that regional planners were of particular importance in the implementation of successful conservation policy and that we currently do not have the adequate resources or structures to conserve the mountain lion. It may be too late to save the mountain lion in Southern California without further and more drastic intervention, but due to the global threats to biodiversity, we need to restructure our approach to conservation. We should utilize flagship, umbrella and keystone species in our conservation plans, prioritize higher-density planning and truly protect the species that we have decided to conserve.

## **Introduction**

In my very first week at Occidental College, I was absolutely thrilled to sight a bobcat on campus. I simply did not expect to encounter wildlife in the urban sprawl of Los Angeles. Since then, I have learned that the successes of urban wildlife in Southern California are not to be understated in the slightest. Mountain lions hunt in our midst. Despite the adverse conditions that we impose upon them, wildlife exists here. The success of wildlife, however, is more a testament to their persistence as opposed to any success of established conservation efforts. A lack of concern with regard to loss of biodiversity, reduced genetic diversity in ecological communities, continued loss/alteration of natural habitat to human interests, ecosystem level management, and problematic policy structures all continue to impede appropriate conservation of the mountain lion today.

Yet, grassroots activists have been relatively successful in addressing the concerns of mountain lion conservation, especially when compared with other states in the nation. California voters passed proposition 117, or the Wildlife Protection Act, on June 6<sup>th</sup> 1990. It stated that it is “unlawful to take, injure, possess, transport, import or sell any mountain lion,” unless the animal is a threat to public health and safety, or if this includes injury or killing of livestock by the mountain lion. Further, the proposition provides 30 million dollars a year, specifically for both the acquisition and protection of land, prioritizing wildlife habitat and corridors in California (Wildlife Protection Act, 1990).

Prior to my enrolment at Occidental, I had worked in the jungles of South India and witnessed human-animal conflict firsthand between livestock owners and tigers, on the fringes of wildlife reserves. The same human-animal conflict is present in Southern California. The field of conservation biology has recently come to accept this as a worldwide issue. As the global human

population increases, and awareness of the importance of protecting our natural environment burgeons, the controversial question of land-use and conservation planning arises.

In this study, I focus on the successes and failures of a wildlife conservation policy in urbanized Southern California that was intended to protect the mountain lion and its natural habitat from advancing human interests. This led me to a specific research question: How has the policy in fact exacerbated human-animal conflict in Southern California? I approached this using a variety of methods: policy analysis of the original proposition 117, analysis of depredation statistics from California Department of Fish and Wildlife, GIS mapping of the California Protected Areas Database, analysis of the Habitat Conservation Fund, interviews with regional conservation planners, and an expert interview with a wildlife biologist.

The policy has proven flawed primarily because it includes mechanisms that result in either continued stressors or continued killing of the mountain lion in the region. This is largely due to a failure to include regional planning departments in the construction and implementation of conservation plans. The policy relied fundamentally on information that was inadequate and set conservation plans off on the wrong foot at a critical time for mountain lions in the region.

By understanding the character of the man-animal conflict in Southern California today in tandem with understanding the priorities of regional planning departments in conservation planning, we can better inform policymakers and land-use planners with regard to appropriate conservation efforts for the mountain lion in an increasingly urbanized environment in Southern California as well as global implications these may have.

## **Background**

In order to construct appropriate policy recommendations with regard to mountain lion conservation, a background of the species and its history in California is presented.

### ***Puma concolor***

The mountain lion (*Puma concolor*) is a large member of the cat family native to the Americas. Referred to by a number of different names including puma, cougar, panther and catamount, they are the fourth largest cat species in the world (Kellert et al. 2002). Mountain lions are solitary for the majority of their adult lives, and territorial (Hornocker 2009). Sizes of mountain lion territories vary greatly contingent on the availability of suitable prey, water, topography and foliage (Grigione et al. 2002). Unlike coyotes and bears, mountain lions are obligate carnivores. Their diet predominantly consists of deer and smaller mammals (Hibben 1939). In areas of increased human encroachment, as is the case in Southern California, mountain lions have been known to predate upon livestock and pets (Torres et al. 1996). Human influence has gravely affected the ability of offspring to new territories, which is extremely important to the overall health of mountain lion populations in terms of genetic sustainability (Sweanor et al. 2000). The population estimates are considered inaccurate, anecdotal and outdated, so gauging whether the species needs further protection for its conservation remains difficult (Smallwood 1994).

## **A Brief History of Mountain Lions in Southern California**

This study is primarily concerned with modern land-use and its relation to the conservation of mountain lions, thus I shall limit the overview of mountain lion history in California from the late 19th century to the present day. “Homocentric ideas of dominion and private property ownership” arrived with the colonizers that arrived in the East and by 1900 had largely extirpated any predator. The discovery of gold in California in 1848 provided the impetus for exponential population growth (Hornocker, 2009). Bison populations were decimated, and livestock numbers increased drastically. Livestock owners created grazing associations that greatly increased their political influence, and in 1907 the federal government assisted in protecting the livestock industry (Mansfield, 1984). Due to the human-wildlife conflict – the conflicting interests of American society and animal – management of the mountain lion became a political imperative.

However, “American attitudes had been transforming for decades from utility to appreciation, from consumption to protection” and the birth of conservation biology as a science called for reducing the human-animal conflict (Hornocker, 2009). Formal policy to this end was called for.



## **Timeline of Mountain Lion History in California (Fitzhugh et al. 1986)**

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1907 \$20.00 bounty instituted.  
1909 Federal predator control began.  
1917 Bounty \$20.00 for male, \$30.00 for female.  
1919 State hired Jay Bruce and C. W. Ledshaw to hunt lions.  
1937 State hired trappers.  
1939 Two State lion hunters added to cover northwestern and southern California (Total = 4).  
1945 Bounty \$50.00 for male, \$60.00 for female.  
1946 Jay Bruce retired.  
1947 C. W. Ledshaw retired.  
1953 Four State lion hunters still employed.  
1959 End of state program.  
1963 End bounties, lions not protected.  
1969 Lions protected by classification as big game animal.  
1970-71 Hunting authorized (4,953 permits, 118 taken).  
1971 Most federal lion control ended.  
1971 Moratorium on lion hunting enacted by legislature.  
1975 Moratorium extended.  
1983 Moratorium extended.  
1986 Moratorium ended.  
1986 Bill introduced to prohibit hunting until 1990.

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### **1990 Proposition 117 classifies mountain lion as specially protected.**

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For the last 28 years, mountain lions have been afforded special protection from Proposition 117. This study explores the successes and failures of the Wildlife Protection Act of 1990, and a characterization of the human-animal conflict in Southern California today.

## **A Review of Existing Literature**

California is often heralded as a pioneer in terms of enacting well-informed and effective policy (Keeley 1993). However the issue of mountain lion conservation in Southern California is nuanced and complex. Scientific studies acknowledge that big cats remain significantly difficult animals to study due to their elusive nature, low densities and wariness of human interaction (Tigas et al. 2003).

## **Ecological Importance of the Mountain Lion**

Mountain lions are top predators. The advancement of the field of conservation biology - specifically the study of trophic cascades – suggests that mountain lions are keystone species that are incredibly important for overall ecosystem health (Crooks, 2002). Conservation biology currently treats threats to biodiversity in the natural world on par with global ecological problems (Keeley, 1993). This stems from the realization that biological diversity is essential for a sustainable future (Keeley, 1993). The idea of predator control is considered outdated (Hibben, 2015). Modern ecology suggests that no flora or fauna should be considered in isolation. Hence, mountain lions today are considered to occupy an important role in ecosystem ecology (Sergio et al. 2006). Recently predators – especially big cats – have been treated as keystone, flagship and umbrella species. For the purpose of this study, keystone species refer to “A species whose impacts on its community or ecosystem are large and would be greater than would be expected from its relative abundance” (Heywood, 1995). Flagship species refer to “charismatic species [that] draw financial support more easily ... and by doing so serve to protect habitat and other species” (Meffe & Carroll, 1997). Umbrella species are those “with such demanding habitat requirements and large area requirements that saving it will automatically save many other

species” (Simberloff, 1998). Literature suggests that the combination of these three designations inform conservation strategy today.

### **Increased human-animal conflict**

The literature thus far largely treats global human population growth and loss or modification of habitat as a given. And as large carnivores are particularly sensitive to human activity, the literature “points to an urgent need for techniques to resolve conflicts between people and predators at either the local or landscape level” (Woodroffe, 2000). As human populations increase, human-wildlife interactions are also increasing worldwide. Further, as the human population increases so will infrastructure and the alteration of natural habitats. The literature suggests that human attitudes towards predators have drastically changed since the latter half of the 20<sup>th</sup> century, and this is reflected in the passage of environmental policy (Heberlein, 2012).

### **Theories of Conservation**

Aldo Leopold defined conservation as “a state of harmony between men and land.” (Leopold, 1949) The harmony-with-nature philosophy is considered “sustainable development – the initiation of human economic activity that does not significantly compromise ecological health and integrity. There has been a shift in approach from commodity-oriented resource management, to prioritizing the “health and integrity of ecosystems” (Callicott, 1994). Further, the literature surrounding human-animal conflict is largely divided and political. The killing of wildlife, even “problem” wildlife, is currently considered socially unacceptable (Treves, 2007).

## **Landscape level Ecosystem Management**

Conservation has traditionally focused on individual species. Conservation efforts geared towards entire ecosystems (and hence predators too) reflects a more recent shift in the literature (Linnell et al. 2001). A fluctuation in one carnivore species ‘can affect profoundly the density of other species’ (Linnell et al. 2001). Therefore, the focus we have had on predator control to protect their prey has been shown ultimately to have the opposite effect (Wielgus, 2014). Mountain lions are currently regarded as essential for maintaining “biodiversity and ecosystem function” (Ripple et al. 2014). Evidence suggests that mountain lions ‘influence processes affecting terrestrial and aquatic species’ and even help to stabilize stream banks (Ripple et al. 2014). Further, management of protected lands is controversial (Grumbine, 2005).

## **Impact of Habitat Fragmentation**

Urban sprawl has resulted in the fragmentation of the majority of wild mountain lion habitat in Southern California. “Urban and residential development continues” even within the boundaries of protected areas (Swenson et al. 2000). As human populations globally continue to increase in unison with environmental concern, habitat fragmentation has been emphasized in literature. The traditional approach of “biogeographic island theory” – which treats remaining habitat as islands within a sea of human disturbance, fails to take into account the pressure of species sustainability (Cook, 1991). Fragmentation favors smaller and more mobile species typically, and not large felids (Johnson & Klemens, 2005). Further, dispersal of genes between each island has been shown to be extremely important. The network of major freeways in Los Angeles serves as a barrier between habitat fragments (Riley et al. 2006). Mountain lions are extremely “sensitive to habitat fragmentation and anthropogenic barriers” (Benson et al. 2016).

Vehicular collisions are a major cause of death for mountain lion populations in Southern California (Beier, 1995).

Lack of genetic diversity and the lethal freeway system has prompted conservationists and policymakers to stress the importance of habitat linkages (Benson et al. 2016) However, the benefits of habitat linkages are much better understood than what components define successful habitat connectivity (Bennett, 2003). The mountain lion population in the Greater Los Angeles Area has the second lowest genetic diversity after the Florida panther (Hedrick 1995). According to scientific models, extinction of the mountain lion population in Southern California is possible in the next 50 years (Benson et al. 2016)

The Liberty Canyon wildlife-crossing project is being hailed as the solution to the problems of this metapopulation of mountain lions. However, the scientific community expresses a lack of faith in the feasibility of habitat corridors as a solution to the issue. Small isolated fragments are adverse for mountain lion populations as they typically occur at low density and avoid humans. Small islands have greater perimeters that increase interaction between human and animal, and therefore more potential for human-wildlife interaction (Soule & Simberloff 1986). Young male mountain lions face pressure to disperse further, but often die as a result of anthropogenic barriers or intraspecific strife (Benson et al. 2016). There is a wealth of research discussing the spatial isolation and dispersal patterns of mountain lions in Southern California that identifies connecting these biogeographic islands as essential to successful conservation. (Morrison & Boyce, 2009) Although they are able to exist in sub-optimal conditions, mountain lions are less able to coexist in the fragmented habitat of Southern California than other species (Crooks, 2002).

The inability of young mountain lions to disperse greatly reduces the genetic biodiversity

of the subpopulation. Further, the older mountain lions that have colonized nearby islands are often part of the same already reduced gene pool (Benson et al. 2016). As stated earlier, “biological diversity is the only basis of sustainable productivity, both for the earth as a whole, and for human beings locally” (Keeley, 1993). Fragmented habitats experience a greater rate of biological impoverishment than more intact ones. (Harrison, 1999) The success of wildlife corridors has not yet been established, especially as the “climate shifts in unpredictable ways” (Robbins, 2011). Some models have been devised to aid regional planners in combating habitat fragmentation (Girvetz et al. 2008).

### **Unexpected Impacts of Climate Change in Mountain Lion Conservation**

The American southwest is altered drastically as a result of climate change. Studies show that as a result of severe drought, mule deer (the mountain lion’s main prey) have been drawn towards urbanization (Pierce et al. 2004). By means of irrigation, swimming pools, and manicured parks, humans have lured the deer and subsequently the mountain lion closer and closer to urban areas (Pierce et al. 2004). With increasing instances of both fire and drought, climate change too poses a threat to mountain lion populations in Southern California. Further studies show that large carnivores can buffer the effects of climate change in ecosystems (Wilmers, 2005). Land management means to suppress the effects of fire and drought in human interest have also adversely impacted the preservation of wild mountain lion habitat (Nelson, 2008).

## **Conflicts of Land-use & Planning interests in Mountain Lion Conservation**

The needs of a growing urban population in Southern California have contributed to the human-wildlife conflict. Further, developed areas are located immediately adjacent to protected natural habitat. Research suggests that in such “edge” areas, human-wildlife interactions are increased (Takahata, 2014). Policymakers and land-use planners have defined SEAs (Significant Ecological Areas) as per the directives in Proposition 117. The literature suggests that human-wildlife interactions will continue to rise. Protected lands and “natural areas being managed [are] ... a mosaic of different land uses, urban development, agriculture, grazing and natural areas managed by other agencies” (Parker, 1993). High human density is usually correlated with increased carnivore extinction; in the case of Southern California, low density urban planning has resulted in more habitat fragmentation and encroachment (Sauvajot, 1993). Literature suggests that the ‘planner’s triangle’ focuses on sustainable development, but does not steer planners to directly achieve any of three goals: environmental protection, economic development and social equity. Rather, there is constant tension (Campbell, 2007). Ideally, the tension of these three priorities results in sustainable development, in the ecological sense. Habitat destruction or alteration has continued despite the provisions in Proposition 117. Further, “the ongoing alteration of the natural world ensures a large queue of threatened organisms for the legal machinery of the ESA to process.” poses a logistical burden. Additionally, “management-induced landscape changes, when based on untested hypotheses, can result in conditions antithetical to their stated purpose” (Ruggiero, 2000). The literature shows that there is an urgent need for strategic planning in appropriate conservation of wildlife populations in an urban landscape (Scott, 2001).

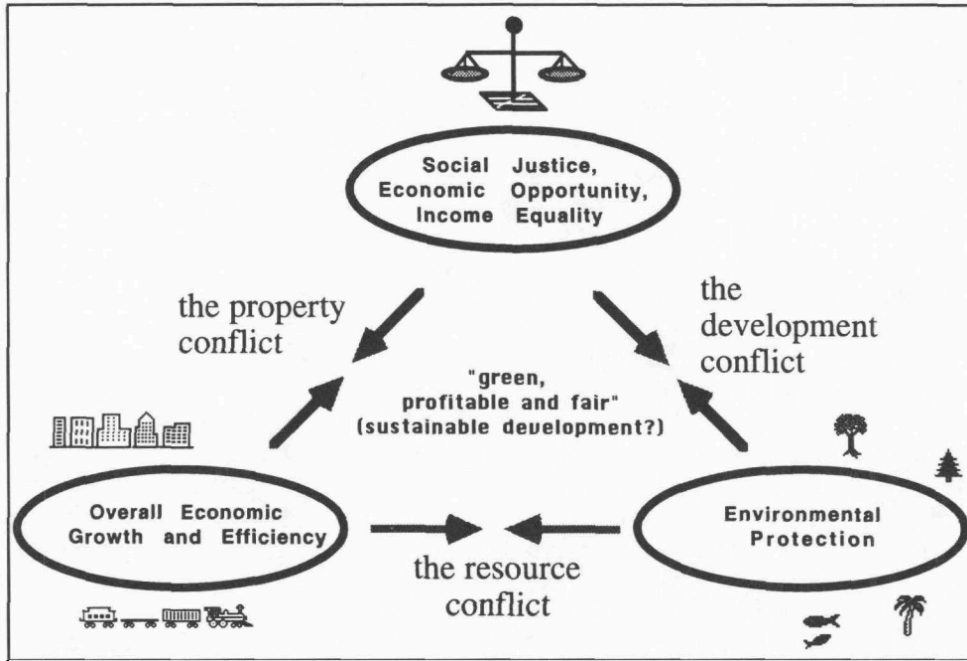


Figure 1 Campbell's Planner's Triangle describes realistic sustainable development as constant state of tension between economic growth, socioeconomic justice & environmental protection.

The literature suggests that “our current patterns of land-use are at once socially, economically and environmentally destructive, and defines the need for not only understanding ecology in an urban environment, but also the importance of enacting ecological policy that emphasizes sustainable development. The “urgency of current environmental trends clearly necessitates a new approach.” (Beatley & Manning, 1997) There is a gap in the literature with regard to consistent environmental guidelines for planners to follow. “Low-density, auto-dependent, sprawling growth” facilitates habitat loss, and the majority of literature explicitly envisions “communities in which the economic base is viable as well as environmentally and socially restorative.” (Beatley & Manning, 1997)



## **Coexistence between human and animal**

Much of the literature focuses on peaceful coexistence as a solution to the human – wildlife conflict, and non-lethal control in instances of threat to public safety (Treves et al. 2003) Livestock predation is the most frequently cited cause of conflict between humans and wildlife (Woodruffe 2005). There are cases of successful coexistence that often involve government compensation as a result of lost livestock (Dickman et al 2011). Mumbai is another instance in which a large feline predator inhabits an urban area alongside man (Athreya, 2012). Studies in India have shown that media representations are extremely influential in affecting public responses to the human-wildlife conflict. (Hathaway et al. 2017) Further, the literature suggests that a reduction in human-animal conflict can be achieved by modifying the “manner and frequency with which humans and domestic animals intersect with that of carnivores” (Treves et al. 2003).

## **Contradictions in the policy**

Although there are a wealth of scientific literature that policymakers utilize, we still see flaws in the policy as a result of the complex issues at hand, as well as the interests of various stakeholders. Depredation permits are still issued regularly in Southern California, when mountain lions prey upon livestock. Despite its protected status, the mountain lion continues to be killed legally in the state as a result of human encroachment. Mountain lion predation on the protected bighorn sheep population sparked a new debate and split conservationists into new ideological camps surrounding wildlife management (Rominger 2003).

## **Methodology**

*How has Proposition 117 exacerbated the human-animal conflict in Southern California?*

In order to best examine the successes and failures of landscape level conservation efforts of the mountain lion, I utilized a mixed methods approach that included:

- Policy analysis of the Wildlife Protection Act of 1990
- A Case Study of the mountain lion population in the Santa Monica Mountains
- Depredation Statistics
- Interviews with three county-level regional planning departments
- Monetary breakdown of Habitat Conservation Fund & land acquisition
- A GIS portrayal of protected lands
- An expert interview with a wildlife biologist

I will delve into the methods that I used and my rationale further in this section. I limited my study area to Ventura, Los Angeles, San Bernardino, Riverside, Orange and San Diego Counties in Southern California. These counties were selected as they all share the following characteristics: a mountain lion population, a growing human population, and are part of a larger ecosystem that is also important in terms of linking the North American mountain lion population with the Central and South American populations. The expansive methodology was employed in order to portray a holistic picture of the current state of mountain lion conservation in Southern California.

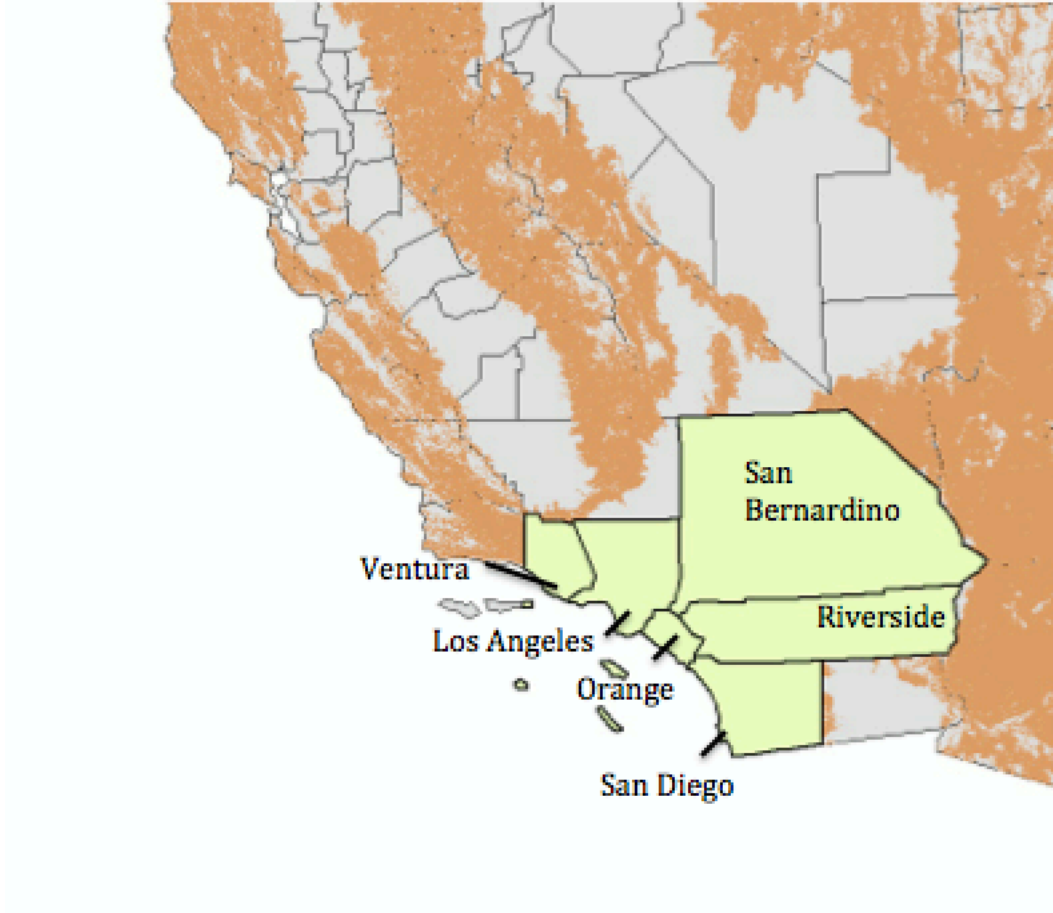


Figure 2 Map depicting the chosen study area including counties of Ventura, Los Angeles, Orange, San Bernardino, Riverside, San Diego, overlaid with the orange that depicts mountain lion range.

## Policy Analysis

I used Dedoose software to denote specific sentiments in the policy, and then analyzed the specific clauses to understand the actual logic and implications of the policy itself. I aimed to determine the mechanisms that determine the ultimate success or failure of the policy on the ground. I defined codes according to the issues identified in the literature review, and analyzed how the policy interacted with these issues. Codes were applied for: fragmentation, mountain lions, planning, human population growth, southern California, wildlife protection, legal take,

land use, habitat connectivity, habitat, genetic diversity, climate change, funds, and public access. The counts of each of these codes were recorded. More qualitative analysis was conducted into the individual clauses outcomes that were highlighted by the coding.

### **Case Study of the Santa Monica Mountains**

The Santa Monica Mountains case study is included to ascertain the cause of death of mountain lions in an attempt to understand the trends and characteristics in mountain lion deaths from 1996 (when data collection began) to 2018. The data was collected by NPS and published on their website as profiles of individual mountain lions within their study. I created a data set that included each individual lion, along with the date in which they died, and cause of death. I aimed to understand the current threats to the mountain lion population and how those threats have changed since 1996, by representing this data temporally. The issues that this specific subset of the mountain lion population experiences are considered to be similar to subpopulations in other areas within my study area.

### **Depredation Statistics**

The California Department of Fish and Wildlife published a dataset of instances in which livestock or pet owners applied for a depredation permit, and the number of lions that were taken by depredation permit subsequently. This dataset was made publicly available for the entire state, with rows for individual counties. I isolated the specific counties within the study area to understand the ways in which a fragmented habitat in urbanized Southern California affects instances of depredation. Depredation was identified in the literature as emblematic of increased human-animal conflict.

## County-level Planning Department Interviews

I conducted interviews with each of the following regional planning departments:

- Land Use Services Department – County of San Bernardino
- Orange County – Planning & Development
- San Diego County – Planning & Development Services

Department	Representative (Participant) & Title
San Diego County Planning & Development Services	Anonymous <i>Planner</i>
Land Use Services Department County of San Bernardino	Tom Hudson <i>Director</i>
Orange County – OC Public Works Planning & Development	Chris Uzo-Diribe <i>Environmental Planner</i>

This qualitative study aimed to understand the ways in which these different planning departments approach land-use planning, which is central to the conservation of the mountain lion, across the counties that make up the larger habitat of the species. By analyzing these interviews and ascribing the priorities of each of these regional planning departments, we are able to build a picture of how the entire ecosystem that the policy sought to protect is being approached, and the issues that regional planners deal with in terms of enacting conservation policy today. This

research design was structured in order to obtain a representation of the problems that planners deal with in implementing policy that seeks to achieve environmental protection, economic development and social equity.

### **Habitat Conservation Fund & Land-Use Mapping**

I used the California Protected Areas Database and the ARCGIS application to interpret the landscape of Southern California's protected areas and determine whether the policy has been successful in terms of achieving its stated goals to acquire more mountain lion habitat in Southern California and create habitat corridors. Additionally, the GIS component allows insight into how the five counties differ in their success, prescribed by Proposition 117. The GIS data was acquired from the California Protected Areas Database (CPAD). I downloaded the GIS files and joined the protected areas with county shape files to include only protected areas within the study area of the five Southern California counties. Further, I mapped the level of protection in each protected area. In addition, I represented whether the protected lands were at the federal, state, or city level.

### **Expert Interview**

Lastly, I included an expert interview to provide a contemporary perspective on the threats and issues from the biological perspective. Dr. Thomas A. Scott is an expert in the field of conservation biology, with particular expertise in the study of animals in fragmented and altered landscapes. He is affiliated with UC Riverside, one of the counties in the study area, and has conducted extensive research into strategic planning and conservation of wildlife populations in urbanizing areas.

## **Participants**

The participants in this study included three regional planners from San Bernardino, Orange, and San Diego counties. They were recruited by email and interviews were conducted over the telephone.

## **Materials**

Informed consent forms advised participants of the purpose of the study and the risks and benefits of participation. Additionally, participants will be given information about how to access findings of the study, contact details of the researchers and information about their voluntary participation. Interviewees were asked a number of questions that differed slightly depending on their interests and knowledge level and it was expressed that they could choose not to answer or end their participation at any time during the course of study. The data compiled will be continually revisited until completion in April 2018.

## **Procedure**

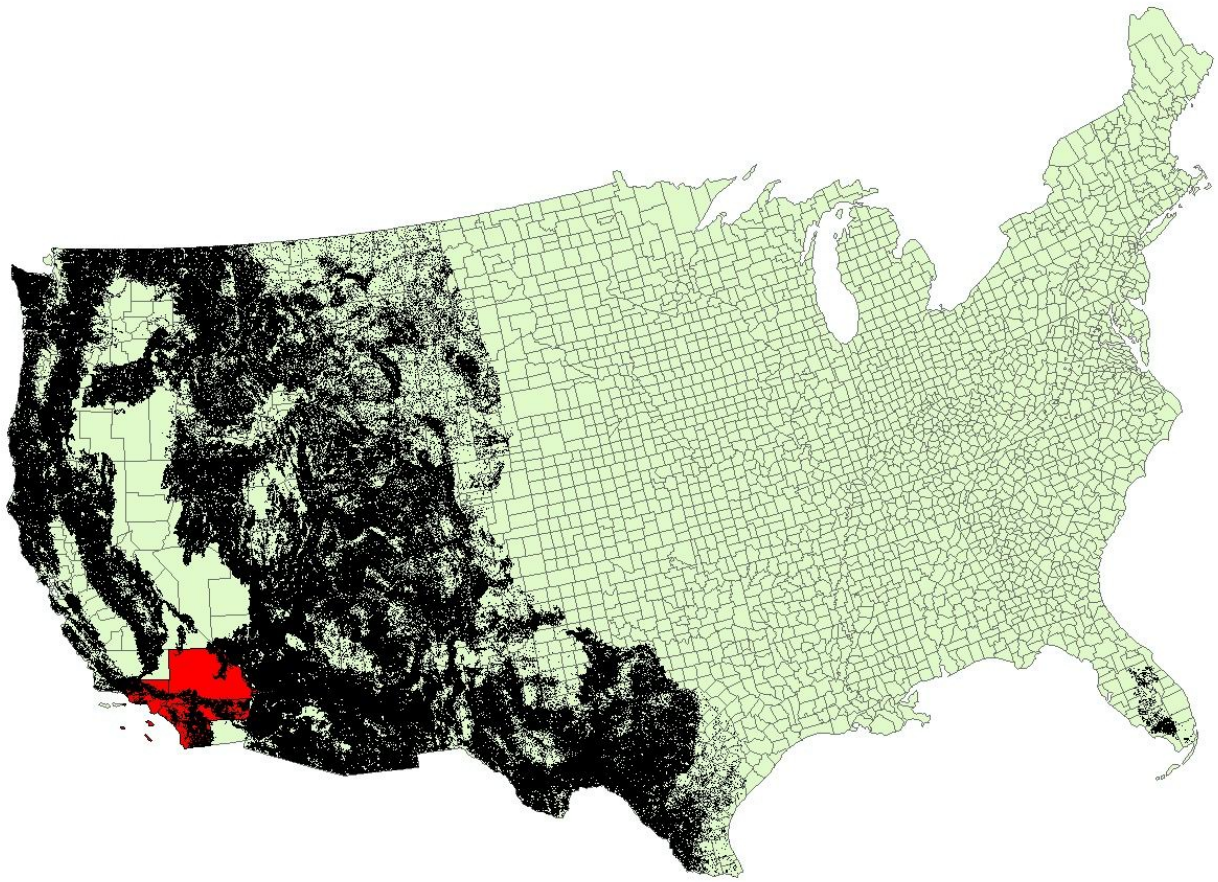
Telephone interviews were conducted with individuals from the different organizations. The interviewee received two informed consent forms, one was returned to the researcher and the other held for their own records. After informed consent was acquired, the interview began with the researcher further explaining the purpose of study. The interviews were audio recorded so that they could be continually revisited, transcribed and analyzed. The interviewee stated their name and position. The researcher continued to ask the interviewees the prearranged questions. The flexible nature of the study allows for follow-up questions pertaining to topics that may arise

within the course of the interview. The participants were finally asked if they had any questions, before they were thanked for their time and cooperation in this study.

After coding the different responses, and determining the themes and barriers that regional planners experience and interact with when handling the human-animal conflict, by analyzing the frequency and weight of key words across interviews, approximations of the focus of regional planning will be made.

The summative findings from this mixed methodology will allow us to ascertain the state of mountain lion conservation in Southern California.





**Figure 3 A Map depicting the mountain lion range (black) in the United States (black) overlaid on my study area (red). This shows the drastically reduced habitat range of the mountain lion, and the importance of my study area as both an urbanizing and linking area. The study area includes Ventura, Los Angeles, Orange, Riverside, San Bernardino, San Diego counties.**

## **Findings & Discussion**

My mixed methods approach afforded many key findings. I found that the mountain lion population in Southern California continues to face a number of grave challenges, that access to protected lands matters, that jurisdiction of protected lands matters, and lastly that regional planning departments are invested in conservation but lack the resources and structure to ensure the success of mountain lion conservation in Southern California.

### ***Mountain Lions Still under Stress in Southern California***

The mountain lion population of Southern California continues to experience challenges that greatly encumber its successful conservation. The case study of mountain lions in the Santa Monica Mountain Range (between Ventura and Los Angeles Counties) and Santa Ana Mountain Range (between Orange and San Diego counties), combined with the policy analysis, allowed for insight into the specific threats that the population faces. The Wildlife Protection Act was intended to protect mountain lions by listing them as a “specially protected mammal” and stating that “it is unlawful to take, injure, possess, transport, import, or sell any mountain lion” (Wildlife Protection Act, 1990). It also includes two clauses, however, that explain the instances in which mountain lions can be in fact killed legally: (1) when a mountain lion is “perceived to be an imminent threat to public health or safety” and (2) when a person “whose livestock or other property is being or has been injured, damaged, or destroyed by a mountain lion.” In the latter instance, the person may report the instance of depredation and apply for a depredation permit to subsequently take the mountain lion within 10 days, and “within a 10-mile radius from the location of the reported damage or destruction” (Wildlife Protection Act, 1990). The literature has suggested that increased depredation is evidence of increased human-animal conflict.

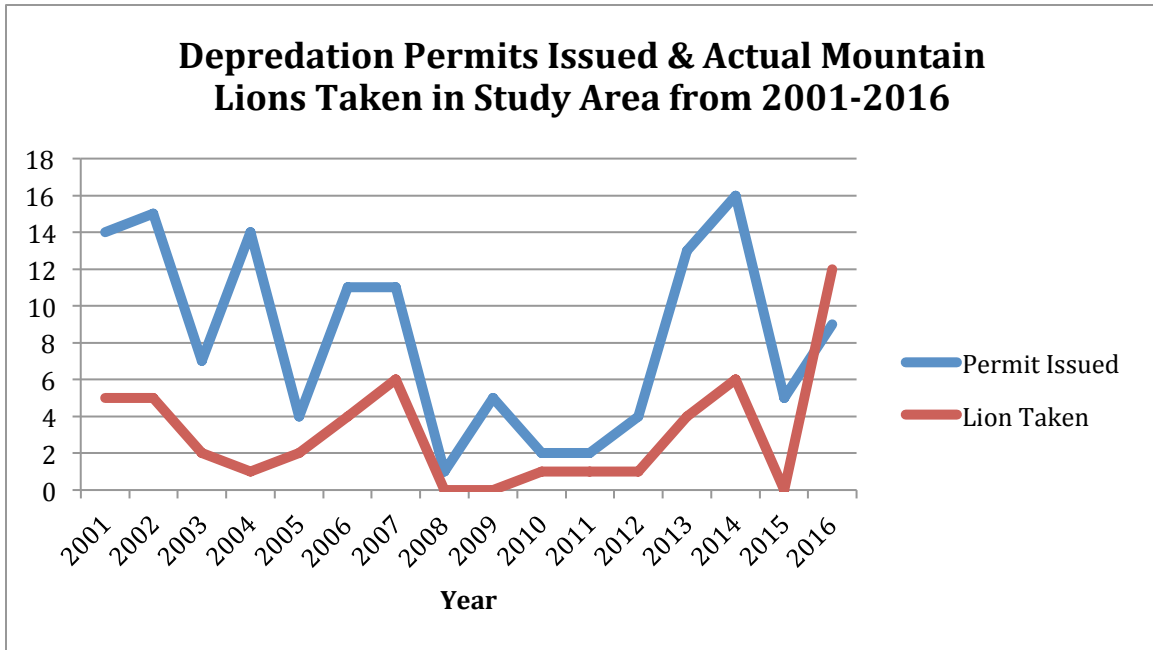


Figure 4 This graph shows the Depredation Statistics from 2001-2016 in the Study Area.

The graph of depredation statistics shows that since 2001 there appears to be no drastic change in the instances of reported depredation. The period from 2008 to 2012 in which few mountain lion permits were requested is possibly emblematic of the pressure from wildlife activists on livestock or pet owners. From 2001-2016, a total of 1586 mountain lions were taken by means of depredation permit in California. This shows that ‘predator control’ is still very much considered an effective method of addressing the human-animal conflict in California. A total of 50 mountain lions were killed by depredation in the study area from 2001-2016, which only makes up just over 3% of the state total. Although, this is most likely due to the fact that mountain lion habitat had already largely been eliminated from the landscape by the beginning of the study. The interview with wildlife biologist Dr. Thomas Scott supported this idea that “by the time people recognized the need to protect the mountain lion in Southern California in 1990, the damage was done, in the sense that the landscape was already developed,” such that it was

incompatible with the conservation goals of the people of California and regional planners (Scott, 2018).

The policy fails to account for the small but persistent mountain lion population, as it continues to employ predator control as a method for solving the human-animal conflict.

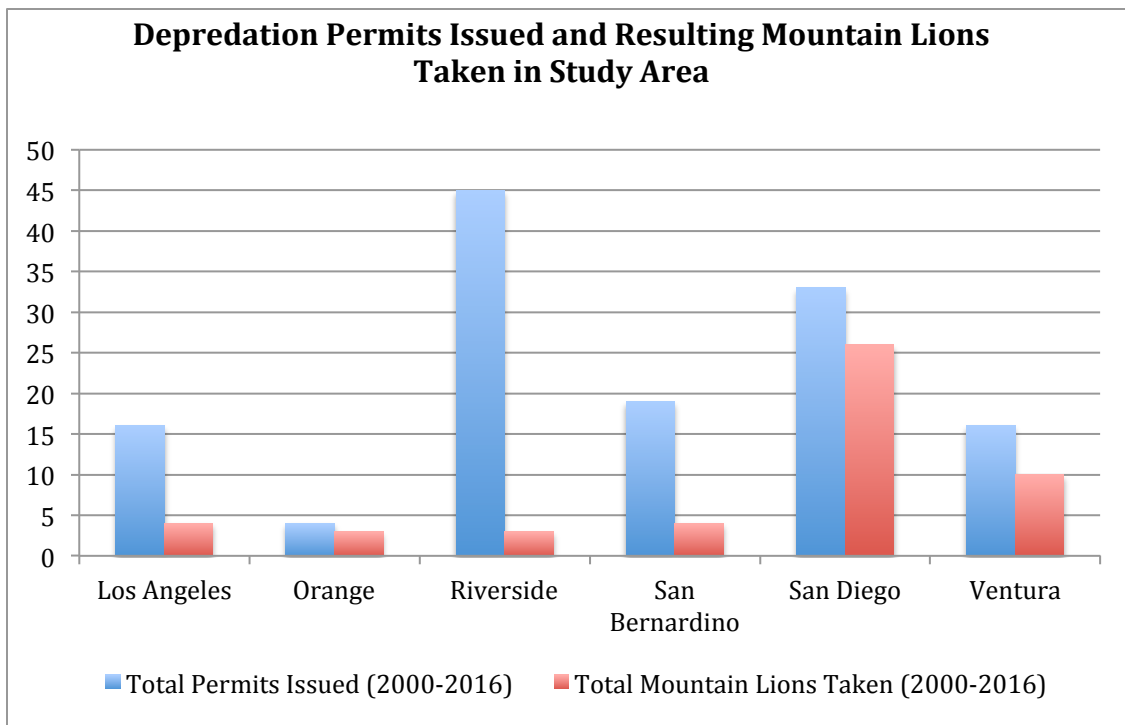


Figure 5 Depredation Statistics by Individual County in Study Area

The above chart shows the differences in permits requested and mountain lions taken by individual county within the study area. We see that Riverside County exhibits the highest number of permits requested at 45 permits, but the actual number of mountain lions killed by depredation permit over the fifteen-year period is only 3 animals. However, in San Diego and Ventura Counties we see that when permits are requested, livestock and pet owners are largely successful in killing mountain lions. This is true for mountain lions in Orange County too, but

both the land area and population is extremely small, and this skews the chart. However, it is important to note that the loss of even one animal can greatly alter the gene pool and drastically increase chances of extinction in the near future for the mountain lion population.

It is difficult to quantify the reasons for the success or failure in successfully killing a mountain lion after the depredation permit is requested. A great deal of social pressure from wildlife activists, combined with the policy requirements of pursuit of the depredating mountain lion, the elusive nature of mountain lions, and the logistical burden of taking the mountain lion are all factors that contribute to the killing of mountain lions by depredation permit. Provided above is a breakdown of depredation permit by county. Forty-five permits were requested in Riverside, yet only three mountain lions were taken from 2001-2016. In San Diego however, thirty-three permits were requested and twenty-six mountain lions were taken.

California Fish & Wildlife released a dataset from 2009-2013 regarding the instances in which mountain lions were taken after being “perceived to be an imminent threat to public health or safety” (Wildlife Protection Act, 1990). Of the twenty lethal killings in California, seven occurred in the study area. The fact that 35% of these instances occurred in the study area relatively recently suggests that human-animal conflict is very much present in Southern California today. Although predator control is widely heralded as ineffective in addressing the nuanced issues of the human-animal conflict, it is still employed through these two clauses.

Further, the case study of mountain lions in the Santa Monica Mountain Range provided a depiction of the ecological health and anthropogenic barriers that a mountain lion population in an urban fragmented habitat experiences. Dr. Scott supported the notion that in urban fragmented populations “there is a change in animal’s behavior which causes morbidity if not mortality” (Scott, 2018).

## Mountain Lions Killed in Santa Monica Mountains Study from 2002-2018

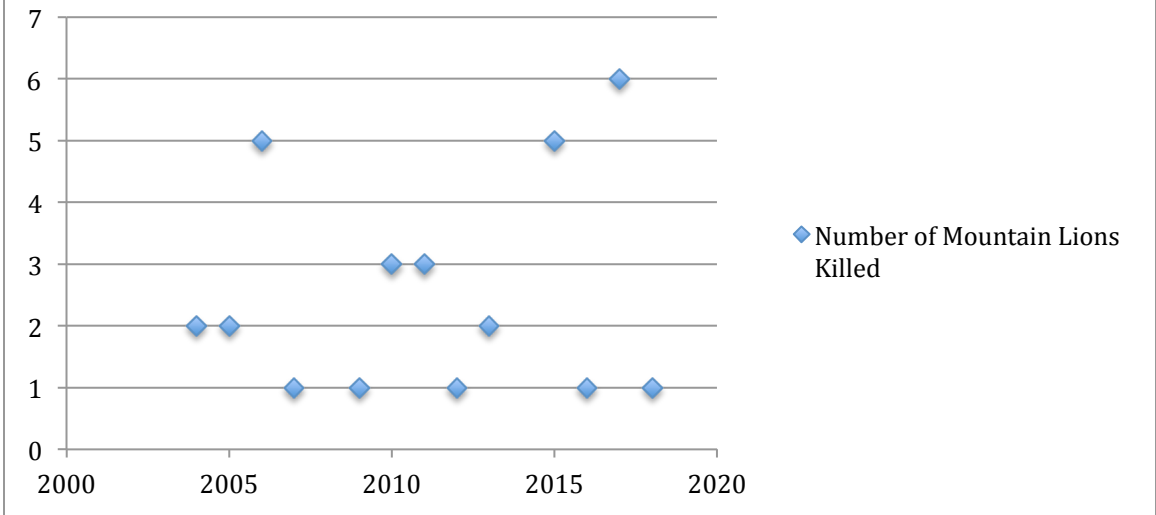


Figure 6 Temporal Representation of Mountain Lions Killed from NPS Santa Monica Mountains Study

## Causes of Death for Mountain Lions in Santa Monica Mountains Study

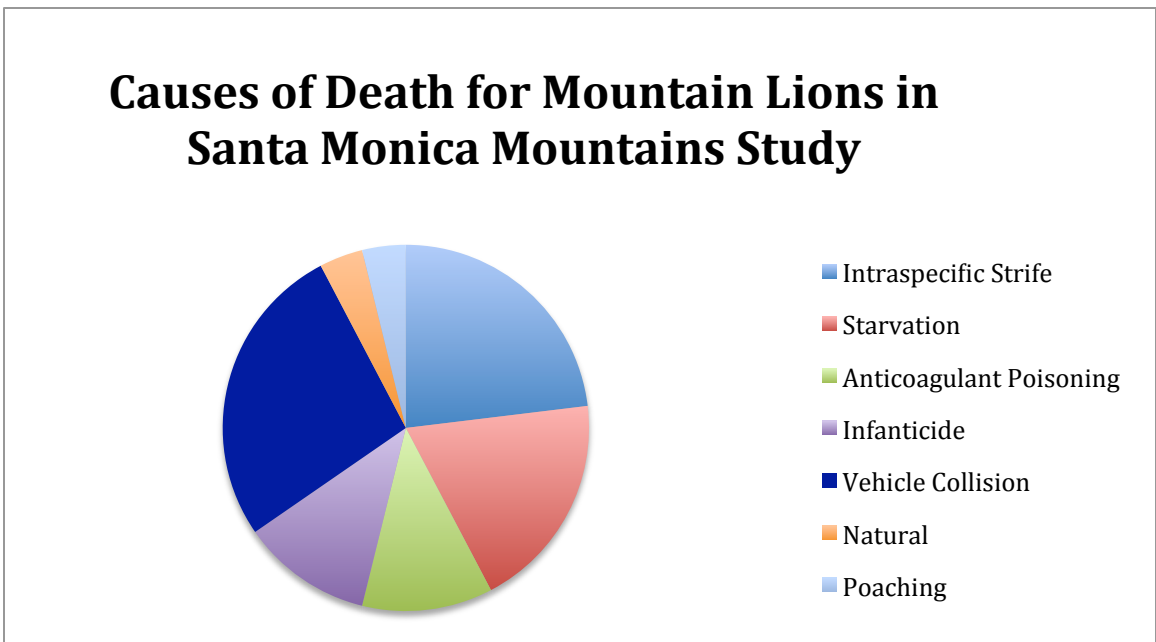


Figure 7 Pie chart to show cause of death of each Mountain lion in NPS Santa Monica Mountains Study

### ***Causes of death are largely anthropogenic in urban mountain lion populations***

The chart prior portrays the proportion of each cause of death in the Santa Monica Mountains case study. The area of the study spans across both Ventura and Los Angeles counties. The percentage of mountain lions that were killed as a result of vehicle collisions was 27%. As seen in the literature, and as was reflected in the 1990 policy, freeways continue to act as an impediment to mountain lion populations in an urbanized environment. Further, the other causes of death could also be considered to be anthropogenic and could have additional adverse effects on the population in the future. Various levels of anticoagulant poisoning have been found in almost every mountain lion studied. Starvation, infanticide and intraspecific strife could also be associated with the reduced size of home ranges for mountain lions in Southern California, compared with mountain lions in areas where habitat is ample and suitable.

I found through this case study that human-animal conflict continues in Southern California, and may have intensified since the inception of the policy in 1990. It remains difficult to assess by how much however, as the interview with Dr. Scott shows that in 1990 very little was actually known about the state of mountain lion ecology in the region.

Some research has been conducted into the impacts of predator control in the instance of loss of livestock or pets in other parts of the country that has concluded that in the long term predator control might actually increase the likelihood of future predation and thus an increased human-animal conflict.



The word cloud above, compiled with the Dedoose application, highlights that depredation and wildlife protection are the most common themes in the Act. Further analysis of the policy evidences the ways in which depredation procedure and wildlife protection are in direct contrast with one another. This packed word cloud depicts the frequency of the codes that I applied in the policy analysis.

Moreover, predator control in this sensitive metapopulation may ultimately result in an increase of livestock and pets lost to depredation by mountain lion. Some research has been conducted with the wolf, another North American predator that too holds a strong cultural significance. These findings may be true for the mountain lion population; if a female rearing



cubs is killed during the period in which she typically teaches her offspring how to hunt, the cubs may be more likely to predate upon livestock and pets, as opposed to wild prey (Wielgus, 2014).

A further dimension that I came across that may present grave challenges was climate change. The literature suggests that the natural preys of mountain lions are increasingly drawn to urban areas as a result of available water – and subsequently the mountain lions follow – increasing the likelihood of human-animal conflict. In addition, the importance of availability of water for development was mentioned repeatedly in the interviews with regional planners. In San Diego, this has seemed to work as a “limiting factor” for urban sprawl (San Diego, 2018). Our manipulation of water resources to satiate the needs of urbanizing areas may play a more impactful role in mountain lion conservation than initially thought. San Diego is one of the few counties in Southern California that has been successful in securing a larger conservation area to the east of the county, but the impacts of climate change in this matter require more investigation. In my interview with the representative from Orange County, I found that “trying to mitigate global warming” was a major priority for the regional planning department (Orange County, 2018).

Dr. Scott – who has worked in the field of conservation biology in Southern California since the eighties – described conservation in the region as “a rear guard action. The invasion is happening no matter what, and you’re slowing it down” (Scott, 2018) He asserts that “the key is no longer how we design our preserves; the key is the persistence of plant and animal species in a prodigal society. The global prodigal society” (Scott, 2018). Here, he confirms the findings from regional planning interviews.

The policy analysis and the literature showed that human population growth was a direct threat to mountain lion populations. According to the state of California, the human population

will grow from 39.4 million in 2016 to 51.1 million by 2060 (CA Department of Finance, 2016). This shows that the mountain lion population in urbanizing areas will continue to be subject to “incompatible land use” (Wildlife Protection Act, 1990). Initiatives like the Natural Community Conservation Plans and Regional Conservation Investment Strategies are “the big battle now of what the region will look like. The multiple species plans or the wildlife protection act did not do the job we needed it to” (Scott, 2018). Proposition 117 highlights the issues facing the mountain lion populations in urbanizing areas, but lacks a component to address the importance of regional planning in combating these issues. Dr. Scott suggests, “if development is going to happen no matter what, how do we create structures of governance so that whatever we thought was important in the landscape remains there” (Scott, 2018). This aspect was sorely lacking in the Proposition in 1990.

### ***Dependence on federal structures in conservation***

On another note, U.S Fish & Wildlife is in extensive communication with the regional planning departments that I interviewed. The mountain lion is not considered an endangered or threatened species however, so the appreciation of mountain lions as umbrella and keystone species is not translated into the planning. Mountain lions “are not one of the covered species in [San Diego’s] plans. But they do benefit from the preserve and connectivity” (San Diego, 2018). The interviews with regional planners revealed that “there is a lack of fundamental understanding about the roles that our predators play in a balanced environment ... and a lot of people don’t see the conflict, about how mountain lion habitat is constantly being infringed and impacted” (San Bernardino, 2018)

### *A huge emphasis on wildlife corridors as an oversimplified solution*

Dr. Thomas Scott contends, “There was an absence of good information [regarding mountain lion populations in Southern California] before 1990.” What was known was needed in 1990, however, was connectivity. In the review of existing literature, differing views regarding the viability of wildlife corridors were presented. Scott adds, “given the cost of a wildlife corridor, it would literally be better to catch an animal every twenty years and introduce it ... to achieve the same amount of mixing for a sustainable population” (Scott, 2018). Wildlife corridors allow for planners and developers to convince themselves that they are achieving sustainability in the Planner’s Triangle. The implementation of wildlife corridors has allowed for planning departments to concede valuable mountain lion habitat to development with the assurance that there would be connectivity. The actual cost of a wildlife corridor – particularly where freeways are involved – is not to be understated.

Conservation policy in 1990 was focused on wildlife corridors as a solution to the genetic problems of the mountain lion population. As a result, the planning policy has largely focused on connectivity too. Yet, the mountain lion population in Southern California still experiences extremely low genetic diversity and barriers to dispersal for mountain lions. In each of the three interviews with regional planners from San Diego, Orange, San Bernardino, wildlife corridors were mentioned as a solution to the human-animal conflict. The interview with Orange County revealed a strong focus on corridors, and characterized development as “gradually encroaching and encroaching into [wildlife] area” (Orange County, 2018) The mountain lion is not listed as a species of concern in planning initiatives in the counties, with the exception of what is called a Regional Conservation Investment Strategy in San Bernardino.

### ***A lack of landscape, ecosystem level planning***

The interviews with county departments show that there is a lack of landscape level planning in Southern California. This is largely due to the failure of “Habitat Conservation Plans and Natural Community Conservation Plans ... to be completed and implemented” (San Bernardino, 2018) Whereas, San Diego has achieved success with the Multiple Species Conservation Plans in the south, and a new one in the north of the county, however, in both of these plans mountain lions are not covered. The interviewee from San Diego mentioned that the plan “that has been in the works for a long time, that is nicely lining up with a lot of the main travel patterns of the cats, but not every main pattern” (San Diego, 2018). The reason cited for the difficulty of ensuring the protection of travel patterns was largely due to jurisdiction issues as some of the pathways go through “neighbouring jurisdictions, city of Oceanside, Carlsbad, Vista, which the county doesn’t have any control over” (San Diego, 2018).

### ***Jurisdiction matters***

I found that in my interviews with regional planning departments in the region that the issue of land that they actually have direct influence over continues to decrease. The Proposition 117 mandate to acquire land for habitat protection on the state, county and city level, and divest from the federal government reflects sentiments of the Sagebrush Rebellion. However, for the purposes of this study, I would like to explore the ways in which jurisdiction of protected lands in the study area of Southern California affects the conservation of the mountain lion.

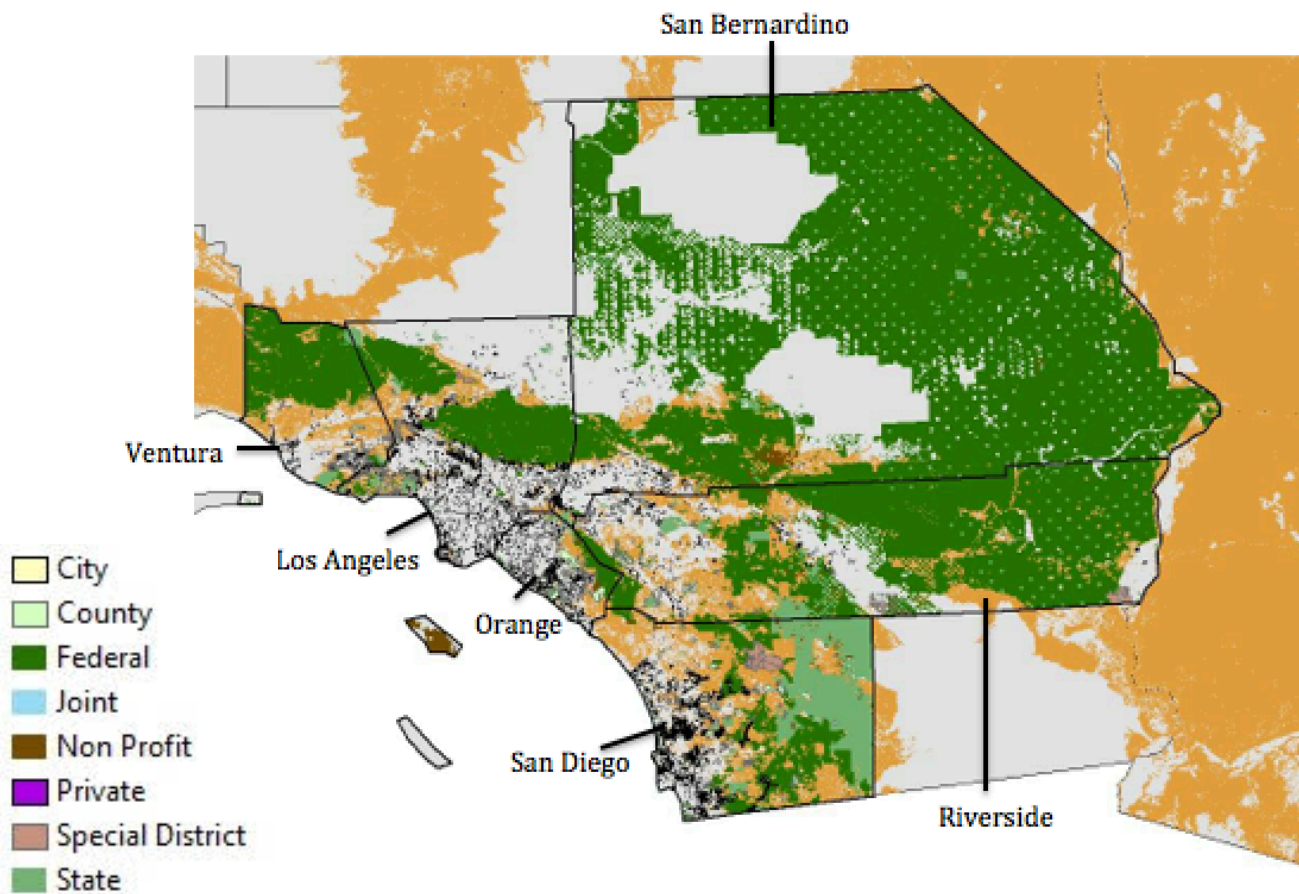


Figure 8 Map showing Protected Land Ownership Level in the Study Area, overlaid on the orange depicting mountain lion range.

The GIS map of the study area shows that the majority of protected land is protected at the federal level. The principal agencies that maintain jurisdiction over these areas are the U.S. Forest Service, Bureau of Land Management, U.S Fish and Wildlife and the National Parks Service. The orange within the study area shows the areas of mountain lion habitats that are not protected lands.

The following table shows the breakdown of overall protected land (in acres) within the study area by county and by agency level. Here, we are able to see the differences in total land area, and the differences in protected land composition in each county.

County in Study Area	Federal	State	County	City	Special District	Non-Profit	Private	Joint	Total
Ventura	584,252	26,627	5,278	3,990	22,282	3,299	-	-	645,728
Los Angeles	688,399	57,464	14,034	58,296	41,662	45,016	187	1	905,059
San Bernardino	8,161,814	275,787	2,895	9,018	2,452	40,671	-	-	8,492,637
Orange	55,818	14,183	48,733	14,531	1,059	5,764	738	-	140,826
Riverside	2,572,670	184,688	23,264	13,667	45,932	17,743	12	-	2,857,975
San Diego	497,073	640,532	39,668	91,858	56,307	28,595	253	-	1,354,286

***Counties lose more and more land by the day***

In the interview with Orange County, I identified that loss of “more and more land to the city – by day” was a large issue that regional planners face. Simply put, there is “limited land we have left to do meaningful planning.” (Orange County, 2018) San Bernardino regional planning echoed this sentiment, in that “states and counties have truly have to compete for authority in land-use decision-making... it is literally an ongoing debate if not a conflict.” (San Bernardino, 2018) Additionally, I found that landscape level planning “can’t be done in a city, and even counties are hard pressed to do it” (San Bernardino, 2018). San Bernardino is the largest county by land area in the United States and hence regional planning on a landscape level may be easier in the sense that larger counties do not face heightened jurisdictional issues. The literature

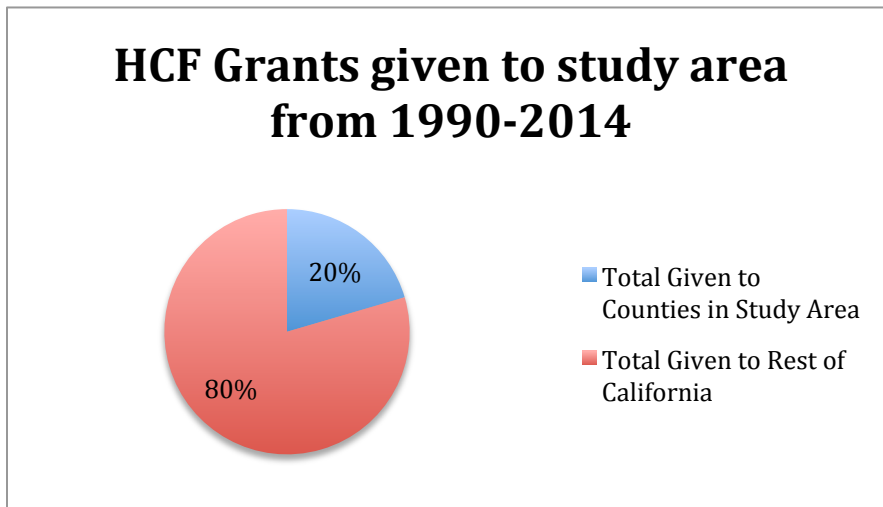
suggested the importance of landscape level regional planning, but there are no measures to ensure this. Habitat Conservation Plans and Multiple Species Plans and Natural Community Conservation Plans that were in part precipitated by the Wildlife Protection Act of 1990 “have generally failed to be completed and implemented” as they require coordination among counties and with federal and state and city level agencies, which are in constant competition with one another for authority (San Bernardino, 2018). This is evidenced in the earlier section with regard to plans overlooking critical lands for the mountain lion population, simply because it does not fall neatly within the jurisdiction of the county that has authority.

***Land management ownership and priorities greatly affect conservation***

At the federal level alone, the U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife and the National Parks Service varying agendas result in different management of the lands, with vastly different priorities. The conservation of a federally unprotected species – the mountain lion – is an unlikely priority for these agencies. Therefore, the appreciation of the mountain lion as a keystone and umbrella species is largely absent from the implementation of land-use management practices. The interview with San Diego County revealed a certain dependence on federal agencies to act in the accordance with the county. With public ownerships, federal lands don’t necessarily count “towards the county programs, but we are relying on them to provide another level of connectivity and protection” (San Diego, 2018). The informal dependency on federal powers to protect and manage certain lands for conservation in the long term may prohibit regional planners from enacting conservation policy that is nuanced and sensitive to the issues with species that are specific to these regions.

***Habitat conservation fund has been ineffective in securing land for conservation***

The National Parks Service manages the Habitat Conservation Fund that was created by Proposition 117 and monies are distributed to various agencies at different levels. The tables and charts following represent the spending of the Habitat Conservation Fund and provide an understanding of whether the policy was successful in its stated purpose of the “acquisition of habitat in urbanizing areas of the state” (Wildlife Protection Act, 1990). From 1990 to 2014, 20% of total HCF grants were given to the study area made up of six counties, of the total 57 counties in California (see below). The policy analysis revealed that half of the funds expended should be spent in Southern California (made up of the six counties in my study, Santa Barbara & Imperial). These are funds that are used for any acquisition of habitat as specified in the policy, not necessarily the preservation of deer or mountain lion habitat.



**Figure 9 Grants given to Study Area of Total Habitat Conservation Grants**



Upon further inspection, of the grants received within the study area identified by the policy analysis as areas of specific concern, only a small proportion were intended for the protection of mountain lion habitat. The following chart provides a breakdown of HCF grants given to the study area by purpose.

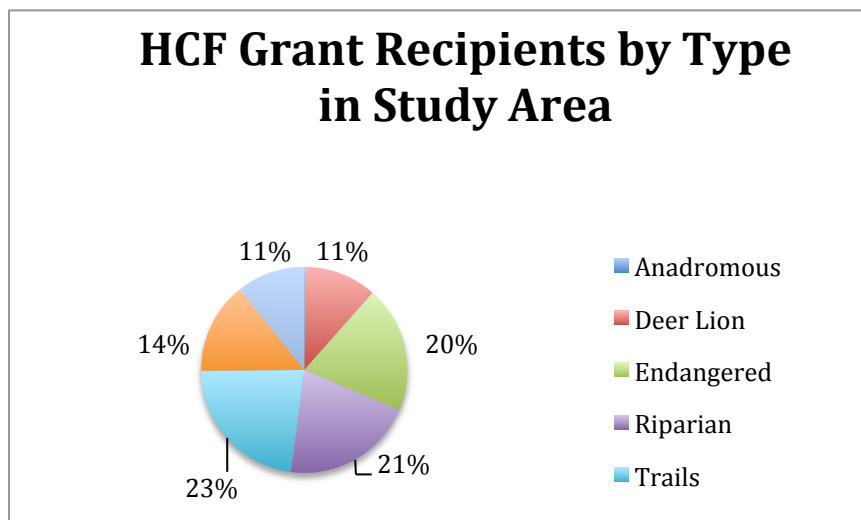


Figure 10 Breakdown of grants given to Study Area by Grant Type

In the study area, only 11% of the Habitat Conservation Fund was spent to address the conservation of the mountain lion in Southern California (\$1,759,772). The question of jurisdiction is particularly important due to the priorities of each level of government. Should federal governments priorities change, there will be no structures in place to ensure the protection of mountain lion habitat from individual growing cities. Although Dr. Scott appreciates the protections that CEQA does provide, some elements of the act are simply

punitive and do not serve the intended purpose. The de facto implications of CEQA at times result in arbitrary measures that “have no benefit for wildlife” but are forced on developers for being out of compliance (Scott, 2018). The three planning agencies interviewed mentioned “working with developers” on “intense biological assessment ... in collaboration with U.S. Fish and Wildlife.” (Orange County, 2018). The regional planners I interviewed mentioned setting aside open-space land “to be maintained as open space,” but also specified that “preserve creation is intended to help species persist, but it also affords watershed protection, passive recreation opportunities, and educational opportunities...” (San Diego, 2018)

***Public access to protected land has negative implications for mountain lion conservation***

Proposition 117 clearly states that:

2781. The people of California find and declare that wildlife and fisheries conservation is in the public interest and that it is necessary to keep certain lands in open space and natural condition to protect significant environmental values of wildlife and native plant habitat, riparian and wetland areas, native oak woodlands, and other open-space lands, and to provide opportunities for the people of California to appreciate and visit natural environments and enjoy California's unique and varied fish and wildlife resources.

In the first article of the act, the importance of access to these protected lands for the people of California is stressed. However, the literature suggested that mountain lions need freedom from excessive human contact. Below is a map depicting access to protected land within the study area.

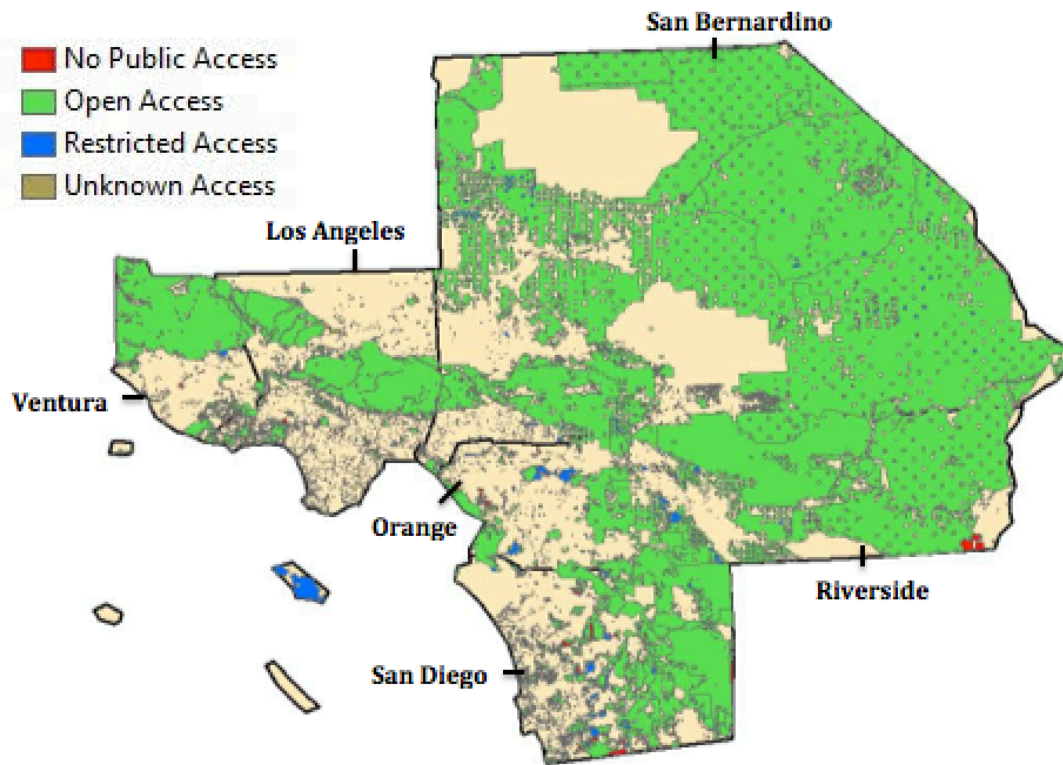


Figure 11 Map of Study Area depicting Protected Land by Access type

The prior map shows that open public access is granted for almost all of the protected land in the study area. Additionally where access is restricted or prohibited, land is managed for its resource values and fenced. I found from my interviews with regional planners and Dr. Scott that “there is a self-awareness that has evolved in the past fifteen to twenty years that “you can’t close an area off to the adjacent people” (Scott, 2018). Dr. Scott describes two conundrums of the wild-urban interface (1) that in the interface between the two, everything along the boundary suffers and (2) there is a crowding of a large amount of demands or desires into the same landscape. This means that although these lands are designated as protected, public access and

type of activity are other factors that need to be considered in the conservation of the mountain lion.

There seem to be two conflicting ideologies at play. First, that wild land needs to remain wild as mountain lion habitat free from human contact, and secondly that passive recreational and educational opportunities are important and harmless. There is little doubt however that the policy's encouragement of Californians to enjoy the protected lands increase human presence in mountain lion habitat and thus increases the likelihood of human-animal conflict. As seen in the literature however, there are examples in which large felids and humans can coexist in urban environments. There are no mechanisms in the policy that address coexistence strategies. The literature suggested that coexistence strategies and policy could substantially reduce the human-animal conflict.

In Southern California, “recreational access and wildlife conservation” are conflicting demands (Scott, 2018). Further, the type of recreational or educational activity is also important to consider (San Diego, 2018). The findings showed that the need to “integrate people into the landscape” and that “the needs of people embedded in the conservation system need to be met in some way” (Scott, 2018) The conflicting demands are referenced in the policy where the importance of keeping lands in natural condition is stressed along with the necessity of access.

### ***A lack of coordination across counties***

The lack of coordination across counties in Southern California with regard to conservation planning was clear. There does appear to be extensive communication with U.S Fish and Wildlife, across county divisions, and between the counties and the cities within them however. Still, the literature identified the importance of landscape level environmental planning

and this is largely absent from the policy. In each of the three interviews with regional planners, coordination across neighboring county jurisdictions was cited as an area for improvement. In the interview with Orange County, the participant explained that when the program was being planned there was extensive communication with the neighbouring counties” but this faded after the plans were adopted (Orange, 2018). The state has not mandated any coordination between counties; therefore the counties must each work with U.S Fish and Wildlife individually to ensure that conservation goals are met. This results in slightly different priorities across individual counties as I found in my interviews with regional planners. In some counties, the mountain lion is included in multiple species plans where in others there is no mention of the species in conservation planning. Here too, mountain lions are not utilized as an umbrella or flagship species.

In addition, I found that regional planning directives were greatly influenced by the priorities and interests of individual directors, revealing that conservation planning was not mandated. One participant decided to pursue a Regional Conservation Investment Strategy based on what they had seen in the news. The voluntary character of regional planning organizations in engaging with conservation provides no guarantee for sustained protections. Counties are not expressly mandated to approach conservation planning in a specific way, and as a result, the county subdivisions in the study area have a wide variety of different responsibilities and capacities. Some counties have more structure to their environmental planning. Each county has operated insularly with regard to their development of environmental priorities devolved from federal and state mandates. These findings point towards a lack of “uniformity in conservation management.” There is no mandate for counties to cooperate with one another in their environmental planning and this has acted as a major impediment to building “an integrated

fabric of conservation plans among all counties” (San Bernardino, 2018). Urban sprawl and low-density planning has encumbered the protection of large areas and increased the interactions between human and animal. The current policy encourages counties and cities to create their own conservation areas, but there is no consideration for the overall region due to the lack of coordination and the jurisdictional quandaries.

### ***A lack of resources & structure in regional planning for mountain lion conservation***

The planner’s triangle described in the literature relates that the friction between the goals of economic development, socioeconomic justice, and environmental protection should ideally result in green, fair and profitable sustainable development. This is in line with the goals of regional planning departments I interviewed. In all cases environmental planning seem to be a priority and I was able to understand the burden on regional planners to address the various conflicts that occur. Environmental protection is also not limited to land protection, and participants mentioned transit-oriented development as a priority going forward. More recently there has been a push to focus urban development in “villages.” The counties do express the desire to keep lands as open space, but as mentioned earlier, have limited jurisdictional authority.

One of the biggest issues that planning departments face is the “waiting and wanting every single last answer to every single question” in creating environmental plans (San Diego, 2018). I found that environmental plans often take decades to implement and are largely unsuccessful in addressing the ecological needs of the landscape. The planning departments that I interviewed highlighted the lack of “landscape level strategies and planning systems ... to ensure the sustainability of our ecosystems” (San Bernardino, 2018). As a result of the policy,

environmental planning for mountain lion has centered on the creation of corridors to achieve connectivity.

Planners are under incessant pressure from developers, and faced with the task of meeting the extremely different needs made by a massive number of conflicting interests. Ultimately, conservation of the mountain lion in Southern California is simply not a priority. Regional planners strive for balance in planning; meeting the goals of economic development, socioeconomic justice, and environmental protection. Proposition 117 intended to protect the mountain lion and offered ways to acquire mountain lion habitat in Southern California, however, its failure to include structures and create resources for planning departments has resulted in worsened conditions for the mountain lion.

The corridor model afforded planners the opportunity to convince themselves that in protecting these smaller areas of land, they could meet the dual needs of economic development and environmental protection. However, wildlife corridors are expensive and remain uncertified. Around the time the policy was enacted into legislature, Dr. Scott recollects that there were propositions to build wildlife bridges across the freeways. This focus on wildlife corridors eventually led to the loss of more conservation areas at a critical time for the mountain lion population.

Overall I found that although the policy lists the mountain lion as a specially protected mammal, it includes structures and mechanisms that have exacerbated the human-animal conflict in Southern California and continue to encumber successful conservation of the species.

## **Limitations**

In attempting to create a comprehensive picture of the human-animal conflict and the state of mountain lion conservation in Southern California I encountered a number of limitations. The breadth of my study resulted in an understanding of the state of mountain lion conservation in California, however in order to more adequately address the research question, I could have perhaps focused on just one research method more significantly. I will address the limitations by the method I utilized.

Firstly, it was difficult for me to situate the importance of land use planning in the conservation of the mountain lion as it was largely left out of the Wildlife Protection Act of 1990. The codes and subcodes that I applied were employed to understand the mechanisms at play in the policy. Perhaps a flow chart could have better described the conflicting structures that I identified in the policy that I analyzed.

Secondly, in the case study of the mountain lion population in the Santa Monica Mountains, I relied heavily on the data from the National Parks Service study. Due to the elusive nature of the mountain lion, the status of many of the mountain lions in the study was unknown. Without ample knowledge of the population in Southern California, it is difficult to provide conclusive evidence of increased human influence on the population. Additionally, the data set only covered the late nineties through 2018. This makes it difficult to understand and compare the stressors to the mountain lion population from when the policy was enacted in 1990 and today. Moreover, it could be argued that this subpopulation is not emblematic of the larger mountain lion population in Southern California. However, with the rising global population and continued prioritization of low density planning, this is probable for many populations in the near future. Therefore, there is a need to address and prevent these stressors in populations



before they begin to appear. Many studies have recently shown that successful conservation may be impossible for the mountain lion in Southern California. It simply may be too late.

Thirdly, I used the analysis of depredation statistics to prove the heightened human-animal conflict in Southern California. These statistics were only made available from 2000-2016. Data on specific locations of depredation was not made available, and as a result I could not represent it spatially. Ideally I would have mapped the population growth from 1990-2018, and overlaid instances of depredation. This would have provided more insight into the correlation between depredation and increased human presence. The chief limitation in this regard was lack of knowledge about the mountain lion population in the area. Despite the numerous studies conducted, little verified information about the mountain lion population exists. This could mean that since the policy was enacted, depredation has increased as a result of a larger number of mountain lions. More information on depredation instances prior to 1990 is required to make further comparisons regarding the ecological health of the mountain lion population. Still, a thriving population of mountain lions in the area is improbable, as supported by the literature.

For the regional planning interviews, I was unable to secure interviews with every county planning department within my study area. I intended to construct a nuanced understanding of Southern California's regional planning successes and failures across the different counties in my study area. This is potentially testament to the breadth and size of planning workloads that I identified in the interviews that I did conduct. Regional planning departments have entirely different structures from one another, which is telling of the issues and priorities that differ greatly by county. It was difficult to determine exactly how successful planning departments were at achieving sustainable development in the center of the planner's triangle. Perhaps I could

have introduced the notion of the planner's triangle in each interview, or created a survey to be completed by county planning employees to more properly locate each county on the conceptual triangle.

Analysis of the expenditure of funds created for habitat acquisition in the study area was beneficial, but could have been mapped spatially in order to better represent the actual impact on the landscape. The GIS mapping that I employed could have been supplemented with these components.

The GIS portrayal of protected lands was useful in understanding the jurisdiction and access problems associated with the issue. However, lands that were expressly protected for mountain lion and deer habitat were not mapped, as this data was not available on the California Protected Areas Database. With more time, I could have spatially joined data from the Habitat Conservation Fund land acquisition publications to better understand the landscape. In addition, I could have included the other stressors to the mountain lion, such as freeways.

In my expert interview with Dr. Scott, I was able to provide a more contemporary perspective on the status of mountain lion conservation in Southern California. More interviews could be conducted to better understand the issues in their entirety. Essentially, the concerns brought up in the interview could possibly be the view of a single conservation biologist, and as mentioned in the literature, the field is divided on many issues.

Overall, I endeavored to do a great deal in this study and ultimately this result in a broad picture of the problem, but more research is required to understand its nuances. My findings still hold weight and reveal that the policy is flawed in affording adequate protection for the mountain lion.

## **Recommendations**

The study proposes a number of recommendations for the issue of mountain lion conservation in an urbanizing area in Southern California. These include the elimination of depredation permits, promotion of coexistence strategies, higher density planning emphasis and a support for environmental programs in regional planning.

### ***Elimination of depredation permits***

The study found that depredation was detrimental to both mountain lion conservation and livestock/pet owners. As a result, I recommend that lethal depredation permits be outlawed as the process essentially functions as disguised predator control. In instances of depredation on pets or livestock, non-lethal measures should be used where possible. If humans are to share the landscape with mountain lions, the continued killing of the species that gained protections near 30 years ago is not in line with the decision made in 1990 to protect the mountain lion. This is especially important as more studies are published that appreciate the mountain lion as extremely important to overall ecosystem health. The 1990 designation of the mountain lion as a “specially protected mammal” was fueled by Californian’s desire to conserve an animal with deep cultural symbolic meaning, which still rings true today. Continued study of mountain lions, and public education and inclusion are necessary in securing the future of the mountain lion in Southern California.

### ***Coexistence is key***

I also recommend coexistence strategies in order to fill the void left by my earlier recommendation. Conflict will undoubtedly exist between human and animal, yet a solution for both parties can be achieved. Compensation for livestock lost to mountain lion predation has recently been employed with success in areas that have experienced high rates of human-wildlife conflict in the past. Increased animal husbandry to reduce the ease at which mountain lions prey upon domestic animals is another suggestion. Creating an integrated fabric of conservation plans that appreciate the mountain lion as a keystone, umbrella and flagship species is of paramount importance to the sustainability of the population in Southern California. Dr. Scott likens the “deep cultural meaning” of mountain lion conservation to that of wolves, that would “trigger the pocketbooks of many Californians” and hopefully help to address the major phenomenon of loss of biodiversity (Scott, 2018).

### ***Higher-density planning***

I recommend high-density planning be emphasized at the county level as a means to address urban sprawl and the implications for the conservation of open space lands. Density of land-use planning is a hotly contested topic in Southern California, typically driven by the conflict between economic development and socioeconomic justice goals. Where environmental protections enter this equation is usually to do with pollution and climate change. The issues of biodiversity loss or ecosystem health are largely absent from planning directives. Therefore, grassroots organizations and advocates for higher density planning should embrace mountain lion conservation into their frameworks.

### ***Living documents and coordination***

In the planning procedure, I advise that coordination among individual county regional planning departments with regard to conservation should be mandated as soon as possible. This will result in the creation of landscape level conservation plans to ensure that land is protected despite a rapidly growing human population. Connectivity is important, but corridors alone between known habitats are not adequate in addressing the needs of mountain lion conservation in the region. Coordination will also allow for knowledge sharing for counties to more directly implement strategies that have worked well in other counties, and forego those that have been unsuccessful.

Further, planning departments should act quickly in implementing programs and be allowed to continually make adjustments to their plans that are informed by conservation biology. Lastly, I think that CEQA should be granted more power to halt development when out of compliance, instead of fining developers who can afford it, which results in landscape that is incompatible with conservation values.

## **Conclusion**

For the mountain lion population in fragmented urban habitat in Southern California, it may be too late. Freeways, continued killing, climate change, and urban encroachment have all contributed to stressful conditions for the population in the region. The human population of Southern California is growing, and unless something drastic changes in terms of approach to land use and land protection, it is very unlikely that mountain lion conservation will be successful.

The policy fails to directly address the threats to the mountain lion population, and has resulted in the exacerbation of the human-animal conflict. The landscape in Southern California has become inhospitable to mountain lions as a result of continued urban encroachment and a lack of conservation planning. Planning departments are not acting with the best available science, but rather experience a time lag of sorts. In 1990, they embraced wildlife corridors as the solution to conservation of the mountain lion as a direct result of the policy. Planners jumped at the opportunity to create a network of corridors, whilst allowing development to continue and continue to encroach on larger protected areas, and in so doing satiate the needs of both developers and conservationists.

There have since been many other state and county initiatives to try and secure more land in larger conservation blocks from different strategies. Yet, 1990 was a critical time in which Californians voted to protect the mountain lion and its habitat. I conclude that the policy designating the mountain lion as ‘specially protected’ and aiming to acquire mountain lion habitat was largely unsuccessful in both of its stated goals. This was largely due to the policy mechanisms, a lack of good science and perhaps most importantly, the lack of resources for

regional planning departments to adequately conserve land for environmental protection and achieve balance in the planners triangle.

Aldo Leopold's land ethic still rings true. We are yet to achieve "a state of harmony between man and land" (Leopold, 1949). The policy intends to protect the mountain lion, but contains mechanisms that result in conditions directly antithetical to its purpose. The California Wildlife Protection Act of 1990 is often heralded as the ultimate protection for mountain lions in Southern California. The continued presence of mountain lions in Southern California is more a testament to their persistence than any true success of conservation policy.

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**Appendix:**

**Table of Habitat Conservation Fund Grants in Study Area**

Award Year	County	Funding Category	Grantee	Project Name	Grant Amount
2013/14	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2012/13	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2012/13	Los Angeles	Deer Lion	County of Los Angeles, Parks	Vasquez Rocks Acquisition	\$200,000
2012/13	San Diego	Deer Lion	County of San Diego, Parks & Recreation	Santa Ysabel Preserve (East) Acquisition	\$164,500
2011/12	Sonoma	Deer Lion	Sonoma Co Ag & Open Space	Klesko Ranch Conservation Easement	\$241,261
2011/12	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2010/11	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2009/10	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2009/10	Alameda	Deer Lion	East Bay R.P.D.	Tyler Ranch Property Acq. Pleasanton Ridge Reg. Pk	\$300,000
2008/09	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2007/08	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2007/08	Riverside	Deer Lion	Riverside County Executive Office	Acquire Deer and Mountain Lion Habitat	\$150,000
2006/07	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2005/06	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Palo Corona Middle Ranch Acquisition	\$1,500,000
2004/05	San Diego	Deer Lion	County of San Diego, Parks & Recreation	Rutherford Ranch/Volcan Mountain Acquisition	\$200,000
2004/05	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Veeder Ranch/Flavin Ranch	\$1,477,500
2003/04	Alameda	Deer Lion	East Bay R.P.D.	Las Trampas Corridor Acquisition	\$250,990
2003/04	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Veeder Ranch Acquisition	\$591,000
2003/04	Los Angeles	Deer Lion	City of Monrovia	Sachan Property Acquisition	\$160,000

2001/02	San Luis Obispo	Deer Lion	City of San Luis Obispo	Johnson Ranch	\$100,000
2001/02	Yolo	Deer Lion	County of Yolo	Otis Ranch	\$122,000
2001/02	Los Angeles	Deer Lion	City of Monrovia	Woodward & Leonard Properties	\$195,000
2001/02	San Mateo	Deer Lion	Midpeninsula R.O.S.D.	Soquel Creek Headwaters	\$226,000
2000/01	Los Angeles	Deer Lion	County of Los Angeles, Parks	Nicholas Canyon	\$332,834
2000/01	Los Angeles	Deer Lion	City of Monrovia	Woodward And Leonard Project	\$56,152
2000/01	Contra Costa	Deer Lion	East Bay R.P.D.	Clayton Ranch	\$200,000
1998/99	Los Angeles	Deer Lion	City of La Habra Heights	Davies Property	\$201,000
1998/99	Mono	Deer Lion	County of Mono, Public Works	Conway Ranch	\$100,000
1998/99	Contra Costa	Deer Lion	County of Contra Costa	Sky Ranch Acquisition	\$225,000
1997/98	Mono	Deer Lion	County of Mono, Public Works	Conway Ranch	\$492,500
1995/96	San Mateo	Deer Lion	Midpeninsula R.O.S.D.	Soda Springs	\$212,500
1995/96	El Dorado	Deer Lion	County of El Dorado	Henningsen-Lotus Park	\$100,000
1995/96	Monterey	Deer Lion	Monterey Co. Admin. Office	Rancho Ventana	\$290,000
1995/96	Ventura	Deer Lion	Rancho Simi R.P.D.	Santa Susana Pass	\$46,286
1994/95	Alameda	Deer Lion	East Bay R.P.D.	Sunol/Ohlone Wilderness	\$256,000
1994/95	Santa Clara	Deer Lion	County of Santa Clara	Jacques Ridge	\$230,000
1991/92	San Mateo	Deer Lion	Midpeninsula R.O.S.D.	Jacques Ridge	\$1,000,000
1991/92	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Santa Lucia Mountain Range	\$1,477,500
1990/91	Solano	Deer Lion	County of Solano	Lynch Canyon (was King Ranch)	\$1,083,500
1990/91	Monterey	Deer Lion	Monterey Peninsula R.P.D.	Santa Lucia Mountain Range	\$1,477,500

Total in Study Area \$1,705,772

**Table from Case Study of Mountain lions in Santa Ana Mountains**

Mountain Lion	Cause of Death	Birth	Death	Notes	Age	Sex
P1	Natural	1996	2009		13	M
P2	Intraspecific Strife	1998	2005		7	F
P3	Anticoagulant Poison	2001	2004	Crossed Freeways	3	M
P4	Anticoagulant Poison	1999	2004	Crossed Freeways	5	F
P5	Intraspecific Strife	2004	2005		1	M
P6	unknown	2004	2006	Inbreeding	2	F
P7	Intraspecific Strife	2004	2006		2	F
P8	Intraspecific Strife	2004	2006		2	M
P9	Vehicle Collision	2001	2007		6	M
P10	Unknown	2006	2010		4	M
P11	Unknown	2006	Unknown		?	M
P12	-	2007	Present	Crossed Freeways	11	M
P13	Unknown	2008	Unknown		?	F
P14	Intraspecific Strife	2007	2011		4	M
P15	Poaching	2004	2011		7	M
P16	-	2009	Unknown	Los Padres	?	M
P17	Starvation	2010	2010	Abandoned Cub	-	F
P18	Vehicle Collision	2010	2011		1	M
P19	-	2010	Present		8	F
P20	Intraspecific Strife	2009	2010		1	M
P21	Unknown	2005	Unknown		?	M
P22	-	2009	Present	Famous & Crossed Freeways	9	M

P23	Vehicle Collision	2012	2018		6	F
P24	Unknown	2012	Unknown		?	M
P25	Unknown	2011	2012		1	F
P26	Unknown	2011	Unknown		?	M
P27	Unknown	2008	2017		9	M
P28	-	2013	Present		5	F
P29	Starvation	2013	2013	Abandoned Cub	-	F
P30	-	2013	Present		5	M
P31	Starvation	2013	2013	Abandoned Cub	-	F
P32	Vehicle Collision	2013	2015		2	M
P33	-	2013	Present		5	F
P34	Anticoagulant Poison	2013	2015		2	F
P35	-	2010	Present		8	F
P36	Infanticide	2015	2015		-	F
P37	Infanticide	2015	2015		-	F
P38	-	2012	Present	Large	6	M
P39	Vehicle Collision	2012	2016		4	F
P40	-	2014	Unknown			
P41	Wildfire	2007	2017		10	M
P42	-	2014	Present		4	F
P43	Infanticide	2015	2015		-	F
P44	Unknown	2015	Presumed Dead		2	F
P45	-	2012	Present	Livestock killing spree	6	M
P46	-	2015	Present		3	F
P47	-	2015	Present		4	M
P48	-	2016	Present		2	F
P49	-	2016	Present		2	F
P50	-	2016	Present		2	M
P51	Vehicle Collision	2016	2017		1	F
P52	Vehicle Collision	2016	2017		1	M
P53	-	2015	Present		3	F
P54	-	2017	Present		1	F
P55	-	2015	Present	Mini horse killer in Feb 2018	3	M
P56	-	2015	Present		3	M
P57	Starvation	2017	2017		1	M
P58	Starvation	2017	2017		1	F
P59	-	2017	Present		1	M
P60	-	2017	Present		1	F
P61	-	2015	Present		3	M

**Text of Policy: Wildlife Conservation Act of California, 1990**

***THE CALIFORNIA WILDLIFE PROTECTION ACT OF 1990***

**SECTION 1.**

This act shall be known and may be cited as the California Wildlife Protection Act of 1990.

**SECTION 2.**

Chapter 9 (commencing with Section 2780) is added to Division 3 of the Fish and Game Code, to read:

**CHAPTER 9. CALIFORNIA WILDLIFE PROTECTION ACT OF 1990**

**Article 1. General Provisions**

**2780.** The people of California find and declare all of the following:

(a) Protection, enhancement, and restoration of wildlife habitat and fisheries are vital to maintaining the quality of life in California. As the state's human population increases, there is an urgent need to protect the rapidly disappearing wildlife habitats that support California's unique and varied wildlife resources.

(b) Much of the state's most important deer winter ranges have been destroyed in the last 20 years.

(c) Critical winter ranges of migratory deer in the Sierra Nevada and Cascade mountain ranges are increasingly subject to incompatible land uses. In some counties, over 80 percent of the critical winter ranges fall on these lands. The potential for incompatible land uses on these lands is a major threat to the survival of many migratory deer herds.

(d) Deer, mountain lion, and other wildlife habitat within the Sierra Nevada, Cascade, Coast Range (including the Santa Lucia Mountains in Monterey County along the Central Coast), Siskiyou and Klamath Mountains; and the Santa Susana, Simi Hills, Santa Monica, San Gabriel, San Bernardino, San Jacinto, Santa Ana and other mountains and foothill areas within southern California, is disappearing rapidly. Small and often isolated wildlife populations are forced to depend upon these shrinking habitat areas within the heavily urbanizing



areas of this state, Corridors of natural habitat must be preserved to maintain the genetic integrity of California's wildlife.

(e) This chapter shall be implemented in the most expeditious manner. All state, officials shall implement this chapter to the fullest extent of their authority in order to preserve, maintain, and enhance California's diverse wildlife heritage and the habitats upon which it depends.

**2781.** The people of California find and declare that wildlife and fisheries conservation is in the public interest and that it is necessary to keep certain lands in open space and natural condition to protect significant environmental values of wildlife and native plant habitat, riparian and wetland areas, native oak woodlands, and other open-space lands, and to provide opportunities for the people of California to appreciate and visit natural environments and enjoy California's unique and varied fish and wildlife resources.

It is the intent of the people, in enacting this chapter, that additional funds are needed to protect fish, wildlife, and native plant resources and that the Legislature should provide those funds through bond acts and other appropriate sources.

## **Article 2. California Wildlife Protection**

**2785.** The following definitions govern the construction of this, chapter:

(a) "Acquisition" includes but is not limited to gifts, purchases, leases, easements, the exercise of eminent domain if expressly authorized, the transfer or exchange of property for other property of like value, transfers of development rights or credits, and purchases of development rights and other interests.

(b) "Board" means the Wildlife Conservation Board.

(c) "Fund" means the Habitat Conservation Fund created by Section 2786.

(d) "Local agency" means a city, county, city and county, or a district as defined in subdivision (b) of Section 5902 of the Public Resources Code.

(e) "Riparian habitat" means lands which contain habitat which grows close to and which depends upon soil moisture from a nearby freshwater source.

(f) "Southern California" means the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura.

(g) "Wetlands" means lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools.

**2786.** Except as otherwise expressly provided in paragraph (3) of subdivision (a) of Section 2787, the money in the Habitat Conservation Fund, which is hereby created, shall be used for the following purposes:

(a) The acquisition of habitat, including native oak woodlands, necessary to protect deer and mountain lions.

(b) The acquisition of habitat to protect rare, endangered, threatened, or fully protected species.

(c) The acquisition of habitat to further implement the Habitat Conservation Program pursuant to Article 2 (commencing with Section 2721) excepting Section 2722 and subdivision (a) of Section 2723, and Sections 2724 and 2729.

(d) The acquisition, enhancement, or restoration of wetlands.

- (e) The acquisition, restoration, or enhancement of aquatic habitat for spawning and rearing of anadromous salmonids and trout resources.
- (f) The acquisition, restoration, or enhancement of riparian habitat.

**2787.** Notwithstanding Section 13340 of the Government Code, the money in the fund is continuously appropriated, without regard to fiscal years, as follows:

(a) To the Department of Parks and Recreation, four million five hundred thousand dollars (\$4,500,000) annually for allocation as follows:

(1) One million five hundred thousand dollars (\$1,500,000) for projects that are located in the Santa Lucia Mountain Range in Monterey County for expenditure by the Department of Parks and Recreation and for grants to the Monterey Peninsula Regional Park District.

(2) One million dollars (\$1,000,000) for acquisitions in, and adjacent to, units of the state park system.

(3) Two million dollars (\$2,000,000) for 50 percent matching grants to local agencies for projects meeting the purposes specified in Section 2786 and, additionally, for the acquisition of wildlife corridors and urban trails, nature interpretation programs, and other programs which bring urban residents into park and wildlife areas. The grants made pursuant to this subdivision are subject to the conditions of subdivision (d) of Section 5910, and Sections 5917 and 5919, of the Public Resources Code, as nearly as may be practicable.

(b) To the State Coastal Conservancy, four million dollars (\$4,000,000) annually.

(c) To the Santa Monica Mountain Conservancy, five million dollars (\$5,000,000) annually for the next 10 fiscal years, commencing with the 1990-91 fiscal year. The money shall be used for the purposes specified in Section 2786 for wildlife habitat, and for related open-space projects, within the Santa Monica Mountains Zone, the Rim of the Valley Corridor, and the Santa Clarita Woodlands. Of the total amount appropriated pursuant to this subdivision, not less than a total of ten million dollars (\$10,000,000) shall be spent within the Santa Susana Mountains and the Simi Hills, and not less than a total of ten million dollars (\$10,000,000) shall be spent within the Santa Clarita Woodlands. These funds shall be expended in accordance with Division 23 (commencing with Section 33000) of the Public Resources Code during the operative period of this section as specified in subdivision (f) and in Section 2797. The Legislature may, by statute, extend the period for expenditure of the funds provided by this paragraph.

(d) To the California Tahoe Conservancy, five hundred thousand dollars (\$500,000) annually.

(e) To the board, the balance of the fund.

(f) This section shall become operative on July 1, 1990, and, as of July 1, 2020, is repealed, unless a later enacted statute, which becomes effective on or before July 1, 2020, deletes or extends that date.

**2788.** Notwithstanding Section 13340 of the Government Code, the money in the fund is continuously appropriated, without regard to fiscal years, to the board.

This section shall become operative only if, and on the date that, Section 2787 is repealed.

**2789.** In areas where habitats are or may become isolated or fragmented, preference shall be given by the agencies expending money from the fund to projects which will serve as corridors linking otherwise separated habitat so that the genetic integrity of wildlife populations will be maintained.

**2790.** Each agency receiving money from the fund pursuant to Section 2787 shall report to the board on or before July 1 of each year the amount of money that was expended and the purposes for which the money was expended. The board shall prescribe the information in the agencies reports that it determines is necessary to

carry out the requirements of Section 2791. The board shall expend the money appropriated to it from the fund subject to the following conditions:

(a) Not more than one and one-half (1-1/2) percent shall be expended for administration of this chapter.

(b) The board shall, to the extent practicable: expend the money in a manner and for projects so that, within each 24-month period, approximately one third of the total expenditures of the money in the fund, including, until July 1, 2020, the expenditures by the agencies receiving money from the fund pursuant to subdivisions (a) to (d), inclusive, of Section 2787, are expended for the purposes specified in subdivision (a) of Section 2786 and approximately two-thirds of the total expenditures of the money in the fund, including, until July 1, 2020, the expenditures by the agencies receiving money from the fund pursuant to subdivisions (a) to (d), inclusive, of Section 2787, are expended for the purposes specified in subdivisions (b) and (c) of Section 2786.

(c) The board shall, to the extent practicable, expend the money in the fund in a manner and for projects so that, within each 24-month period, approximately six million dollars (56,000,000) of the money, including, until July 1, 2020, the expenditures by the agencies receiving money from the fund pursuant to subdivisions (a) to (d), inclusive, of Section 2787, are expended for the purposes specified in subdivision (d) of Section 2786.

(d) The board shall, to the extent practicable, expend the money in the fund in a manner and for projects so that, within each 24-month period, approximately six million dollars (56,100,000) of the money, including, until July 1, 2020, the expenditures by the agencies receiving money from the fund pursuant to subdivisions (a) to (d), inclusive, of Section 2787, are expended for the purposes specified in subdivision (e) and (f) of Section 2786.

(e) To the extent practicable, the board shall expend the money appropriated to it from the fund in a manner and for projects so that, within each 24-month period, approximately one-half of the total expenditures of the money in the fund, including, until July 1, 2020, the expenditures by the agencies receiving money from the fund pursuant to subdivisions (a) to (d), inclusive, of Section 2787, are expended in northern California and approximately one-half in southern California.

(f) Subject to the other requirements of this section, the board may allocate not more than two million dollars (\$2,000,000) annually for the purposes of this chapter to one or more State agencies created by the Legislature or the people which are authorized by other provisions of law to expend funds for the purposes of this chapter.

**2792.** If any agency designated in Section 2787 ceases to exist, or is otherwise unable to expend the funds appropriated by Section 2787 to that agency for the period specified, the board or its successor agency shall expend the same funds for the same purpose.

**2793.** The board and any other state or local agency that expends any funds appropriated from the fund on environmental enhancement, restoration, or improvement projects shall utilize the services of the California Conservation Corps and local community conservation corps to the extent practicable.

**2794.** In implementing this chapter, the state or local agency that manages lands acquired with funds appropriated from the fund shall prepare, with full public participation, a management plan for lands that have been acquired, which plan shall reasonably reduce possible conflicts with neighboring land use and landowners, including agriculturists. The plans shall comply with the California Environmental Quality Act (Division 21 (commencing with Section 210W) of the Public Resources Code).

**2795.** (a) The Controller shall annually transfer 10 percent of the funds in the Unallocated Account in the Cigarette and Tobacco Products Surtax Fund to the Habitat Conservation Fund.

(b) No additional allocation of funds from that account shall be made by the Legislature for purposes of this chapter or for any other natural resource or environmental protection program.

**2796.** (a) The Controller shall annually transfer the sum of thirty million dollars (\$30,000,000) from the General Fund to the Habitat Conservation Fund, less any amount transferred to the Habitat Conservation Fund from, but not limited to, the following accounts and funds:

- (1) The Public Resources Account in the Cigarette and Tobacco Products Surtax Fund to the extent authorized by the Tobacco Tax and Health Protection Act of 1988.
- (2) The Unallocated Account in the Cigarette and Tobacco Products Surtax Fund pursuant to subdivision (a) of Section 2795.
- (3) The California Environmental License Plate Fund.
- (4) The Endangered and Rare Fish, Wildlife, and Plant Species Conservation and Enhancement Account in the Fish and Game Preservation Fund, (S) Any other non-General Fund accounts and funds created by the Legislature or the people for purposes which are consistent with the purposes of this act.
- (6) Any bond funds which are authorized by the people after July 1, 1990, which may be used for purposes which are identical to the purposes specified in Section 2786.
- (7) The Wildlife Restoration Fund.

(b) Except for transfers from the Endangered and Rare Fish, Wildlife, and Plant Species Conservation and Enhancement Account, transfers from the Fish and Game Preservation Fund are not transfers for purposes of subdivision (a) and shall not be made to the fund, Transfers of federal, local, or privately donated funds or transfers from the State Coastal Conservancy Fund pursuant to Section 31011 of the Public Resources Code to the fund are not transfers for purposes of subdivision (a).

(c) This section does not limit the amount of funds which may be transferred to the fund or which may be expended for fish and wildlife habitat protection either from the fund or from any other sources.

(d) This section shall become operative on July 1, 1990, shall become inoperative on June 30, 2020, and, as of January 1, 2021, is repealed, unless a later enacted statute, which becomes effective before January 1, 2021, deletes or extends the dates on which it becomes inoperative and is repealed,

**2797.** (a) The people find it necessary to acquire, restore, and improve the rapidly disappearing wildlife habitat of southern California in the quickest and most efficient manner possible using existing governmental resources, Therefore, notwithstanding Section 33216 of the Public Resources Code, Division 23 (commencing with Section 33000) of the Public Resources Code shall continue in effect for the period that funds may be expended pursuant to subdivision (c) of Section 2787.

This subdivision shall not become operative if, prior to June 6, 1990, Section 33216 of the Public Resources Code has been amended to extend the operative effect of that Division 23 to at least July 1, 1995.

(b) If subdivision (a) of this section does not become operative, the controller shall increase the annual transfer of funds pursuant to subdivision (c) of Section 2787 on a pro rata basis so that the total amount available to the Santa Monica Mountains Conservancy for purposes of this chapter pursuant to that subdivision (c) is fifty million dollars (\$50,000,000).

Nothing in this section precludes the Legislature from extending the time for expenditure of funds pursuant to subdivision (c) of Section 2787.

**2798.** Acquisitions of real property made pursuant to this chapter shall be done in compliance with the land acquisition law as existing or as hereafter amended and as it applies to the agencies designated in Section 2787, and in compliance with subdivision (a) of Section 5929 of the Public Resources Code.

**2799.** Every expenditure made pursuant to this chapter shall comply with, the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code).

**2799.5.** Reasonable public access to lands acquired in fee with funds made available pursuant to this chapter shall be provided except when that access may interfere with habitat protection.

**2799.6.** Only those amounts of money which are transferred to the fund from the General Fund pursuant to Section 2796 may be reappropriated for purposes of this chapter by a two-thirds vote of the Legislature.

### SECTION 3.

Section 3950.1 is added to the Fish and Game Code, to read:

**3950.1.** (a) Notwithstanding Section 3950 or any other provision of this code, the mountain lion (genus Felis) shall not be listed as, or considered to be, a game mammal by the department or the commission.

(b) Section 219 does not apply to this section, Neither the commission nor the department shall adopt any regulation that conflicts with or supersedes this section.

### SECTION 4.

Section 4189 of the Fish and Game Code is repealed.

### SECTION 5.

Chapter 10 (commencing with Section 4800) of Part 3 of Division 4 of the Fish and Game Code is repealed.

### SECTION 6.

Chapter 10 (commencing with Section 4800) is added to Part 3 of Division 4 of the Fish and Game Code, to read:

## CHAPTER 10. MOUNTAIN LIONS

**4800.** (a) The mountain lion (genus Felis) is a specially protected mammal under the laws of this state.

(b) It is unlawful to take, injure, possess, transport, import, or sell any mountain lion or any part or product thereof, except as specifically provided in this chapter or in Chapter 2 (commencing with Section 2116) of Division 3, This chapter does not prohibit the sale or possession of any mountain lion, or any part or product thereof, when the owner can demonstrate that the mountain lion, part or product thereof, was in the person's possession on June 6, 1990.

(c) Any violation of this section is a misdemeanor punishable by imprisonment in the county jail for not more than one year, or a fine of not more than ten thousand dollars (\$10,000) or by both that fine and imprisonment, An individual is not guilty of a violation of this section if it is demonstrated that. in taking or injuring a mountain lion, the individual was acting in self-defense or in defense of others.

(d) Section 219 does not apply to this chapter, Neither the commission nor the department shall adopt any regulation that conflicts with or supersedes any of the provisions of this chapter.

**4801.** The department may remove or take any mountain lion, or authorize an appropriate local agency with public safety responsibility to remove or take any mountain lion, that is perceived to be an imminent threat to public health or safety.

**4802.** Any person, or the employee or agent of a person, whose livestock or other property is being or has been injured, damaged, or destroyed by a mountain lion may report that fact to the department and request a permit to take the mountain lion.

**4803.** Upon receipt of a report pursuant to Section 4802, the department, or any animal damage control officer specifically authorized by the department to carry out this responsibility, shall immediately take the action necessary to confirm that there has been depredation by a mountain lion as reported, The confirmation process shall be completed as quickly as possible, but in no event more than 48 hours after receiving the report, If satisfied that there has been depredation by a mountain lion as reported, the department shall promptly issue a permit to take the depredateing mountain lion.

**4804.** In order to ensure that only the depredateing mountain lion will be taken, the department shall issue the permit pursuant to Section 4803 with the following conditions attached:

(a) The permit shall expire 10 days after issuance.

(b) The permit shall authorize the holder to begin pursuit not more than one mile from the depredation site.

(c) The permit shall limit the pursuit of the depredateing mountain lion to within a 10-mile radius from the location of the reported damage or destruction.

**4805.** Whenever immediate authorization will materially assist in the pursuit of the particular mountain lion believed to be responsible for the depredation reported pursuant to Section 4802, the department or the animal damage control officer may orally authorize the pursuit and taking of the depredateing mountain lion, and the department shall issue a written permit for the period previously authorized as soon as practicable after the oral authorization.

**4806.** Any person issued a permit pursuant to Section 4803 or 4805 shall report, by telephone within 24 hours, the capturing, injuring, or killing of any mountain lion to an office of the department or, if telephoning is not practicable, in writing within five days after the capturing, injuring, or killing of the mountain lion, At the time of making the report of the capturing, injuring, or killing, the holder of the permit shall make arrangements to turn over the mountain lion or the entire carcass of the mountain lion which has been recovered to a representative of the department and shall do so in a timely manner.

**4807.** (a) Any mountain lion that is encountered while in the act of pursuing, inflicting injury to, or killing livestock, or domestic animals, may be taken immediately by the owner of the property or the owner's employee or agent, The taking shall be reported within 72 hours to the department. The department shall investigate the depredation, and, if the mountain lion was captured, injured, or killed, the mountain lion or the entire carcass of the mountain lion which has been recovered shall be turned over to the department, Upon satisfactorily completing the investigation and receiving the mountain lion or the carcass, if recovered, the department shall issue a permit confirming that the requirements of this section have been met with respect to the particular mountain lion taken under these circumstances,

(b) The department shall undertaken complete necropsy on any returned mountain lion carcass and report the findings to the commission, The commission shall compile the reported findings and prepare an annual written report that shall be submitted to the Legislature not later than the January 15 next following the year in which the mountain lion was taken.

**4808.** As used in this chapter, "agent" means the agent or employee of the owner of the damaged or destroyed property, any county or city predator control officer, any employee of the Animal Damage Control Section of the United States Department of Agriculture, any departmental personnel, or any authorized or permitted houndsman registered with the department as possessing the requisite experience and having no prior conviction of any provision of this code or regulation adopted pursuant to this code, A plea of nolo contendere is a conviction for purposes of this section.

**4809.** Mountain lions authorized to be taken pursuant to this chapter shall be taken by the most effective means available to take the mountain lion causing the damage or destruction, except that no mountain lion shall be taken by means of poison, leg-hold or metal jawed traps, and snares.

## SECTION 7.

If any provision of this act or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of the as which can be given effect without the invalid provision or application, and to this end the provisions of this act are severable.

## SECTION 8.

Except amendments of subdivisions (c) and (f) of Section 2787 and subdivision (d) of Section 2796 of the Fish and Game Code to extend the operative effect of those sections, which maybe enacted by statute enacted by the Legislature, this act shall be amended only by a statute approved by a vote of four fifths of the members of both houses of the Legislature. Any amendment of this act shall be consistent with, and further the purposes of, this act, except the Legislature shall not reallocate the funds allocated by Sections 2787 and 2788 of the Fish and Game Code, change the expenditure requirements of Section 2791 of the Fish and Game Code, or change the transfers of funds required by Sections 2795 and 2796 of the Fish and Game Code.

## SECTION 9.

This act shall be liberally construed to further its purposes.