

FINAL
WILDLIFE CORRIDOR ASSESSMENT REPORT

VENTURA STATE ROUTE 118

LSA

May 27, 2004

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VENTURA STATE ROUTE 118

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LSA

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1.0 INTRODUCTION

1.1 BACKGROUND

The purpose of the wildlife corridor study was to assess present and future functionality of potential wildlife linkages across State Route 118 (SR-118) from Moorpark to Chatsworth (Figure A1). Potential wildlife linkages included in the study were selected based on culvert, underpass, and overcrossing locations across SR-118 (Figure A2). Wildlife linkage use by medium- to large-sized mammals was the focus of the study. Mammals of interest were mountain lion (*Puma concolor*), mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), and badger (*Taxidea taxus*).

This study provided data on species composition, mobility between the Santa Susana Mountains and the Simi Hills, and linkages used. It also assessed the present and future conditions of these linkages based on planned developments. Recommendations to maintain or enhance the viability of these linkages are provided.

This survey and analysis were part of the environmental review process for the completion of the Rocky Peak Road interchange on SR-118. The wildlife corridor study was required in order to determine the impacts of the proposed project on the wildlife connectivity between the Santa Susana Mountains and the Simi Hills.

The impacts of the Caltrans improvement project – Rocky Peak Road Eastbound Off-Ramp and Westbound On-Ramp – and other future developments upon the functionality of the potential wildlife linkages across SR-118 are also discussed in this report.

The following terms are defined for the sake of clarification:

Home Range	An area that an animal may use to forage, hunt or otherwise occupy but not actively defend from competitors.
Minimum Habitat Area	The amount of undeveloped land that can sustain a viable population of a target species for at least 100 years (Beier 1995).
Overpass	Overpass could be either a road overcrossing or a vegetated land bridge. In Europe, the vegetated overpass is also called an “ecoduct” or “green bridge.”
Species Density	The number of individuals per unit area.

Target Species	The literature review focused on the large and medium-sized mammals known to occur in Simi hills and Santa Monica mountains. For this study, large-sized mammals are mountain lion and mule deer. Medium-sized mammals are bobcat, coyote, gray fox, and badger.
Underpass	Could be a corrugated pipe culvert, reinforced concrete pipe or box culvert, or bridge. Underpasses can be developed with a dirt or paved road or be a natural dry canyon or stream channel.
Viaduct	A very long and elevated bridge that spans an entire valley, canyon, or multiple streams or river channels.
Wildlife Corridor	A strip of habitat that connects two otherwise separated larger habitat areas (Santa Monica Mountains Conservancy [SMMC] 1990).
Wildlife Crossing (Linkage)	A specific location along a transportation right-of-way where a strip of habitat and a passageway exist together and could potentially function as a pathway for wildlife to cross the right-of-way. The term “linkage” is used interchangeably in this document with “wildlife crossing.”
Wildlife Passageway	A term used in this review to identify the actual structure used by wildlife to cross a transportation right-of-way. Passageways can either be underpasses or overpasses (Jackson and Griffin 1998).
Landscape Permeability Analysis	A geographic information system (GIS) technique used to model the relative cost for an animal to move between protected core areas based on how each species is affected by habitat characteristics, such as slope, elevation, vegetation composition and road density (SCWP 2003).
Core Area	Land owned publicly or privately and managed primarily for wildlife conservation and biodiversity protection (SCWP 2000).
Least-Cost Corridor	A route identified by landscape permeability analysis as potentially the best for the animal to move between population core areas.

Maintaining wildlife corridors among southern California’s remaining wildlands is important in order to keep a level of function of the regional ecosystem. Wildlife movement is necessary for survival of the species populations. As explained in a South Coast Missing Linkages report (SCWP 2003), wildlife must move through wildlands to seek food, shelter, and mates; for dispersal of offspring; seasonal migration; and for the ability to escape from disturbances, fire, disease and predation.

Habitat fragmentation disrupts ecosystem function and population sustainability. Besides disrupting movement, habitat fragmentation also eliminates the top-down regulation of smaller predators and prey animals by large predators, stops gene flow causing in-breeding, results in extinctions of local populations of species, hinders seed and pollen dispersal, encourages invasion of non-native species, and alters patterns of hydrology, nutrient cycling, and plant community succession (SCWP 2003).

Roads specifically impact wildlife movement and ecosystem function through direct loss of habitat and by facilitating adjacent development, land use changes, and other road construction (NCHRP 2003). Roads compromise the quality of the adjacent habitat areas through construction disturbance, pollution (noise, air, soil, water, and light), illicit dumping access, litter, hydrology alteration, and invasion or planting of non-native plants (NCHRP 2003). Other impacts to wildlife include loss of habitat areas by species that avoid roads, animals killed by vehicles, and increased human exploitation in the form of poaching, hunting, pets, and off-highway-vehicles.

1.2 WILDLIFE CROSSINGS (LINKAGES) EVALUATED IN THIS STUDY

Wildlife movement across State Route 118 right-of-way was the focus of this study. The study area extended from Collins Road in the City of Moorpark, Ventura County, to De Soto Avenue in the Chatsworth community of the City of Los Angeles.

There are only two locations where undeveloped land occurs on opposite sides of SR-118. One is west of Simi Valley between Collins Drive and Madera Road. Happy Camp Canyon, Faulker Canyon, Alamos Canyon, Simi Valley Landfill, and Brea Canyon are located north of SR-118 in this western undeveloped area. Arroyo Simi and Tierra Rejada Park are located south of SR-118 at the west end of Simi Valley. The second undeveloped area is located east of the City of Simi Valley extending from Kuehner Drive to Iverson Road. White Oak Park, Hummingbird Creek, Rocky Peak Park, Devil's Canyon, and Browns Canyon are located north of SR-118 and east of Simi Valley. Corriganville Regional Park, Santa Susana Mountains State Historical Park, and Chatsworth Park are located east of the City of Simi Valley and south of SR-118.

Within the undeveloped areas described above, wildlife data were collected at highway structures large enough to be potentially used by large and medium-sized mammals. These structures were bridge underpasses, overpasses, and concrete box or metal pipe culverts. Camera and scent stations placed at locations west of Simi Valley included Collins Drive, Alamos Canyon Road, and Simi Valley Landfill. Other tracking stations were placed east of Simi Valley. These were near Keuhner Road (White Oak Park, Hummingbird Creek), Corriganville Equestrian Tunnel, Rocky Peak Park (Rocky Peak Road), Santa Susana Pass, Iverson Road, Movie Lane, Canoga Avenue, and Browns Canyon. Refer to Table A in the Methods section of this report for a detailed list of the camera and scent stations used in the wildlife tracking study.

Quarterly surveys were conducted from May 2003 through February 2004. Cameras and scent stations were placed within crossing passageways (culverts, bridges and underpasses) and in likely pathways, such as ridgelines and creekbeds (Figure A2). During the first survey, stations were placed within the City limits in addition to the two less developed areas west and east of the City of Simi Valley. The camera stations within the urbanized areas, Sand Canyon and Las Llajas Canyon were stolen after the first night. These stations were not used again as part of the study.

1.3 QUESTIONS ADDRESSED

The study was designed to answer the following questions.

1. What wildlife crossings (linkages) are presently functional or have adjacent activity in terms of wildlife use?
2. What large- and medium-sized mammals are using the linkages?
3. What are the present and future potential constraints to wildlife movement in these areas?
4. How will the proposed project contribute to constraints positively or negatively?
5. What linkages have the potential to be used by wildlife if enhanced?
6. What enhancement proposals would be most beneficial to maintaining or enhancing the viability of the corridors if costs or any other constraints are not considered?
7. What would be the order of priority of said enhancement proposals based on a cost-benefit analysis?
8. What would the costs associated with these enhancement proposals be?
9. Where could these enhancement proposals be implemented?
10. How long would it take to develop and implement these enhancement proposals?

In addition to the actual wildlife movement data generated by this study, a literature review of the following subjects was conducted: wildlife corridors, wildlife highway crossings, and wildlife use of artificial structures to cross a highway right-of-way. Other research studies on wildlife movement near highways in the mountainous areas of Ventura County were reviewed. In addition, current development planning documents and proposed project environmental documents were reviewed.

1.4 PROJECT TEAM

LSA Associates, Inc. (LSA) was contracted by Caltrans District 7 for a comprehensive wildlife corridor survey and analysis study. In addition to the LSA wildlife biologists conducting the field surveys and background research, public agencies also provided support. These agencies included Caltrans, National Park Service, Santa Monica Mountains Conservancy, Rancho Simi Recreation & Park District, the Cities of Simi Valley and Moorpark, the Counties of Los Angeles and Ventura, and South Coast Wildlands Project.

2.0 METHODS

2.1 STUDY AREA

Survey stations were to be placed at or near the following Caltrans-designated overpasses, underpasses, or culverts: Collins Drive box culvert, Equipment Passage (box culvert) east of Collins Drive, Oak Park culvert, Alamos Canyon Road underpass, Simi Valley Landfill pipe culverts, Corriganville Equestrian Tunnel (box culvert), Rocky Peak Road overpass, Iverson Road underpass, and Canoga Avenue underpass.

During the first field meetings between Caltrans, LSA, and National Park Service biologists, some survey stations were eliminated and others were added as part of the tracking study. Oak Park pipe culvert was eliminated from the study because a catchment basin blocks the culvert opening south of SR-118. Corriganville Tunnel was not included in the first survey in order to add other potential crossing locations that had not been monitored in the previous wildlife movement studies by other parties. Iverson Road was not considered a viable survey location because a private gated community blocked access north of SR-118. Table A lists the stations added or abandoned during the four quarterly surveys.

The first survey included two drainages within the City limits of Simi Valley as potential crossings through drainages and parks in the City and then into Arroyo Simi. These were Sand Canyon box culverts and Las Llajas underpass. In addition to the originally proposed survey stations, Browns Canyon and an abandoned overcrossing (bridge) named Movie Lane were added. Scent stations at White Oak Park and Hummingbird Creek were also added to the study since these areas, located north of SR-118, were relatively undeveloped at the time of the study. Other drainages with large culverts east and west of the Alamos Canyon underpass were added to the study as camera and scent stations.

After the first quarterly survey, the Sand Canyon and Las Llajas Canyon camera and scent stations were eliminated due to vandalism and human use of the area. Corriganville Equestrian Tunnel was added to the study as originally intended. Camera and scent stations were installed at this crossing. Also, a scent station was installed on the south side of SR-118 at Iverson Road with the intention of capturing wildlife activity parallel to the southern SR-118 right-of-way.

2.2 SURVEY TECHNIQUES

The presence and diversity of wildlife were documented using photo stations, scent stations, searching for scat and tracks, and incidental direct observations. Scent stations were placed from 100 to 500 feet of the crossings. Scent stations consisted of a bait bag attached to a stake surrounded by diatomaceous earth (DE), which was utilized as the tracking medium. Each scent station was refilled with bait and checked daily for identifiable tracks. Once all tracks were recorded, the DE was smoothed and additional DE was added when necessary. General surveys for tracks and scat were conducted throughout the study area each day in the vicinity of the scent stations, photo

TABLE A – Ventura SR-118 Wildlife Corridor Assessment Camera and Scent Stations

Station Name	Quarterly Survey			
	First	Second	Third	Fourth
	May 6-10, 2003	July 30-Aug. 3, 2003	Nov. 17 – 22, 2003	Feb. 5-9, 2004
Collins Drive Box Culverts	2-35mm cameras with passive sensors 3-scent stations	2-35mm cameras with passive sensors 3-scent stations	2-35mm cameras with passive sensors 3-scent stations	2-35mm cameras with passive sensors 3-scent stations
Equipment Passage Box Culvert	1-scent station	1-scent station	1-scent station	1-scent station
Alamos Canyon West Box Culverts	3-35mm cameras with passive sensors 2-scent stations	2-35mm cameras with passive sensor 1-35mm camera with active sensor 2-scent stations	3-35mm cameras with passive sensors 2-scent stations	3-35mm cameras with passive sensors 2-scent stations
Alamos Canyon Road Underpass	2-35mm cameras with active sensors 2-scent stations	2-35mm cameras with active sensors 2-scent stations	2-35mm cameras with active sensors-STOLEN 3-scent stations	2-35mm cameras with active cameras 2-scent stations
Alamos Canyon East Pipe Culvert	2-scent stations	2-scent stations	2-scent stations	2-scent stations
Simi Valley Landfill Pipe Culvert	2-35mm cameras with passive sensors 4-scent stations	2-35mm cameras with active sensors 4-scent stations	2-35mm cameras with passive sensors-VANDALIZED 4-scent stations	2-35mm cameras with passive sensor 4-scent stations s
Sand Canyon Wash Box Culverts	1-35mm camera with passive sensors-STOLEN	Not Included	Not Included	Not Included
Las Lajas Box Culverts	2-35mm camera with passive sensors-STOLEN	Not Included	Not Included	Not Included
White Oak Park	1-scent station	1-scent station	1-scent station	1-scent station
Hummingbird Creek Concrete Pipe Culvert	1-scent station	1-scent station	1-scent station	1-scent station

TABLE A – Ventura SR-118 Wildlife Corridor Assessment Camera and Scent Stations

Station Name	Quarterly Survey			
	First	Second	Third	Fourth
	May 6-10, 2003	July 30-Aug. 3, 2003	Nov. 17 – 22, 2003	Feb. 5-9, 2004
Corriganville Equestrian Tunnel	Not Included	2-35mm cameras with passive sensors-STOLEN 4-scent stations	2-35mm cameras with passive sensors 4-scent stations	2-35mm cameras with passive sensors 4-scent stations
Rocky Peak Road Overcrossing	2-video cameras with passive sensors-REMOVED 1 DAY BY CHP 3-scent stations	2-video cameras with passive camera-VANDALIZED 3-scent stations	2-video cameras with passive camera-VANDALIZED 1-35mm camera with passive sensor 3-scent stations	2-35mm cameras with passive sensors-1 CAMERA STOLEN 3-scent stations
Santa Susana Pass Concrete Arch	2-35mm cameras with passive cameras	2-35mm cameras with passive cameras	2-35mm cameras with passive cameras	2-35mm cameras with passive cameras
Iverson Road Underpass	Not Included	1-scent station	1-scent station	1-scent station
Movie Lane Overcrossing	2-35mm cameras with active sensors 2-scent stations	2-35mm cameras with active sensors 2-scent stations	2-35mm cameras with active sensors 2-scent stations	2-35mm cameras with active sensors 2-scent stations
Canoga Avenue	2-video cameras with combination active-passive sensors	2-video cameras with combination active-passive sensors-VANDALIZED	2-video cameras with combination active-passive sensors-VANDALIZED	1-35mm camera with active sensor
Browns Canyon Viaduct	4-scent stations	4-scent stations	4-scent stations	3-scent stations

stations and along the trails used by the biologists. These surveys consisted of a biologist meandering throughout the study area, locating game trails, and observing sign (e.g., tracks and scat). Automated photo stations (Trail Master) were set up at various wildlife crossings and consisted of passive or active, 35mm camera or video stations. Passive photo stations consisted of a sensing unit that sensed heat and movement in a detection area in the shape of a fan and were used where the area to be covered was narrow and confined. Active photo stations consisted of an infrared sensing unit (transmitter and receiver) and were used in locations where a wide span needed to be covered by the camera. Video camera stations were installed at high-traffic (vehicle and human) crossings in order to increase the recording capacity. All the photo stations were checked each day during the study to ensure that they were functioning properly and that enough film and battery power remained to record any activity during the following 24-hour period. Schematics of the camera station installations are provided in Work Study Plan and Quarterly Reports included in Appendix C.

Refer to Appendix C for a complete description of the tracking survey techniques in the Methods section of the quarterly survey report (February 2004). The methods used to set up the tracking (scent) and camera stations are described in the attached reports.

2.3 COORDINATION WITH OTHER SURVEY EFFORTS FROM OTHER AGENCIES, COMPANIES, ORGANIZATIONS, ETC.

In addition to the LSA wildlife biologists conducting the field surveys and background research, public agencies also provided support. Caltrans provided highway engineering plans, low-altitude aerial photos, and development project environmental reports as they became available for public review. Raymond Sauvajot, National Park Service Chief of Planning, Science and Resource Management, attended a site visit with Caltrans and LSA in order to determine the most appropriate locations for the scent station and camera locations. All potential crossing locations within the study area were visited by the project team. Paul Edelman, Santa Monica Mountains Conservancy Biologist, also contributed reports prepared on wildlife corridors in the Simi Hills, Santa Susana Mountains and Santa Monica Mountains. Also, Seth Riley, National Park Service Wildlife Ecologist, contributed his experience to the project and data from a concurrent long-term research study on mountain lion movement in the Santa Monica Mountains, Simi Hills, and Santa Susana Mountains. Lauren Funaiole, City of Simi Valley Senior Planner, assisted with the project by providing information on current and proposed development projects in Simi Valley. GIS data layers were provided by Ventura County Resource Management Agency (RMA 2004), the Santa Monica Mountains Conservancy (SMMC 2004), and the City of Simi Valley (2004a). Population growth projections were obtained from Southern California Associations of Governments (SCAG).

2.4 DATA ANALYSIS

2.4.1 Development

The most recent summary of planning projects was provided by the City of Simi Valley Department of Planning, City of Moorpark, City of Los Angeles, County of Ventura and County of Los Angeles. GIS land use data were obtained by contacting the planning departments of the City and County offices, and the region's open space conservation agencies. Proposed roadway improvements and design constraints were obtained from Caltrans District 7.

2.4.2 Population Growth

Population growth projections were obtained from Save Open Space and Agricultural Resources (SOAR), SCAG, and Federation for American Immigration Reform (FAIR) web sites.

2.4.3 Past Wildlife Studies

Relevant scientific literature was obtained from web searches, journal abstract search at University of California-Riverside, and from researchers actively studying large mammal movement and wildlife corridors in southern California.

The following wildlife studies were provided to the project team. This research information was used to design the wildlife corridor assessment study and, in conjunction with the SR-118 survey data, to develop mitigation recommendations. Other national and worldwide sources of wildlife corridor and crossing research literature were also reviewed as part of the wildlife corridor assessment.

- *Critical wildlife corridor/habitat linkage area between the Santa Susana Mountains, the Simi Hills and the Santa Monica Mountains* by Paul Edelman, Santa Monica Mountains Conservancy, 1991.
- *Wildlife use of underpasses and culverts crossing beneath highways in southern California*, a thesis submitted in partial fulfillment of the requirements of the degree of Master of Science in Biology, California State University-Northridge by Sandra Ng, 2000.
- *Use of highway undercrossings by wildlife in southern California* by S. Ng, and others unpublished version, 2002.
- *A preliminary evaluation of the American badger (Taxidea taxus) in the Santa Monica Mountains National Recreational area, California* by S. G. Lupis, and others, 1999.
- "Habitat corridors in the eastern Santa Monica Mountains," in *Interface Between Ecology and Land Development in California* by K. Radtke in 1993.
- *Preserving the critical link: a discussion on the wildlife corridor from the Santa Susana Mountains to the Santa Monica Mountains via Simi Hills* prepared by the Santa Monica Mountains Conservancy in 1990.
- *Report on Santa Monica Mountains National Recreational Area Mountain Lion project for period of March 2002 – August 2003 (September 2003) and project updates via email* by Seth Riley, Eric York, and Raymond Sauvajot, National Park Service in February 2004.
- *Regional wildlife corridors, wildlife utilization, and open space in the Simi Valley region, Ventura and Los Angeles Counties, California* by Psomas, 2002.
- *Effects of urbanization and habitat fragmentation on bobcats and coyotes in southern California* by Seth Riley, and others, unpublished version.
- *In my experience...a checklist for evaluating impacts to wildlife movement corridors* by P. Beier and S. Loe in *Wildlife Society Bulletin*, 1992.

- “Effects of urban encroachment of Wildlife in the Santa Monica Mountains,” by R. Sauvajot and M. Buechner in *Interface between Ecology and Land Development in California*, 1993.
- “Ecological corridors in urban southern California,” by J. Lyle and R. Quinn in *Wildlife Conservation in Metropolitan Environments*, 1991.
- “Distribution and status of carnivores in the Santa Monica Mountains, California: Preliminary results from radio telemetry and remote camera surveys,” by R. Sauvajot, and others in 2nd *Interface between Ecology and Land Development in California*, 2000.
- *South Coast Missing Linkages Project: a linkage design for the Tehachapi Connection* by Kristeen Penrod and others South Coast Wildlands Project. Unpublished report, 2003.
- *South Coast Missing Linkages Project: a linkage from San Monica Mountains Recreational Areas to Los Padres National Forest* by Kristeen Penrod and others Unpublished draft report. February 2004.
- *Biological Technical Report for the North Park Village Specific Plan No. 2001-01 Ventura County, California* prepared for City of Moorpark by BonTerra Consulting. Costa Mesa, California. June 30, 2003.

3.0 RESULTS

3.1 WILDLIFE CROSSINGS

The results of the quarterly surveys are summarized by passageway in the following section. A description of the location, structure, surrounding habitat and land use, disturbances, wildlife observations and suitability as a functional wildlife crossing is provided for each study location. The wildlife observation data from all the quarterly surveys are summarized in Tables B and C. Table B is the photo station data and Table C lists the scent station and other incidental species observations. In addition, observations of the target species by researchers during other wildlife movement studies in Simi Valley are provided in Table D. A pull-out map is provided in Appendix B to show the locations of the large- and medium-sized mammal observations of the wildlife studies in the SR-118 study area (Figure B1).

3.1.1 Collins Avenue Tunnel (Faulker Canyon) and Equipment Passage

Location. The Collins Tunnel (Faulker Canyon), located in the City of Moorpark, is at the western end of Simi Valley in Ventura County. The Equipment Passage is located an estimated 500 feet east of Collins Tunnel. It is used to access a municipal water reservoir on a hill to the northeast.

Description. This potential wildlife crossing was included as part of the study because this passageway is located at the west end of the open space area that extends eastward to Madera Road. Several unnamed tributaries originate north of the Collins Crossing in the area of Big Mountain in the Santa Susana Mountains. North of the crossing, these tributaries merge into one main wash that is a tributary to Arroyo Simi. The natural wash east of Moorpark ends abruptly at an approximately six-foot tall drop structure, where it is converted into reinforced concrete trapezoidal channel. The reinforced concrete channel extends approximately 300 feet south toward the freeway where it transitions from the concrete channel to the Collins tunnel undercrossing, (a 15-foot tall by 15-foot wide box culvert) under the freeway. The tunnel turns toward the southwest under SR-118. The total length of the tunnel is 750 feet. The concrete trapezoidal channel resumes again south of the SR-118, extending several hundred feet to the west before terminating into the Arroyo Simi Wash.

The equipment passage is a large concrete box culvert under SR-118. The dimensions of this structure are approximately 20 feet in height and width and 200 feet in length. A scent station was installed along the access road on the north side of SR-118. No scent stations were placed south of SR-118, because it would have been too exposed to vandals.

Table B – Ventura 118 Wildlife Corridor Study - Photo Station Data, May 2003 - February 2004

	Mountain Lion				Mule Deer				Coyote				Bobcat				Grey Fox				Raccoon				Opossum				Skunk			
	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04
Collins Drive Culvert																				X	X	X					X					
Alamos Canyon West Culvert															X							X						X				
Alamos Canyon Undercrossing								X																								
Simi Valley Landfill Culvert													X																			
Corriganville Tunnel				X																												
Rocky Peak Road Overpass																																
Santa Susana Arch																				X	X	X	X									
Movie Lane Overpass																																
Canoga Avenue Undercrossing																																

Note: Shaded cell represents a tracking station that was not installed or was stolen at the crossing. "X" indicates that that species was determined to be in the area by camera station. For more detailed information regarding frequency of target species visits, please see the quarterly reports.

Table C – Ventura 118 Wildlife Corridor Study - Indicators of Target Species Via Scent Stations or General Observations, May 2003 - February 2004

	Mountain Lion				Mule Deer				Coyote				Bobcat				Grey Fox				Raccoon				Opossum				Skunk			
	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04
Collins North of SR 118									X			X											X	X	X				X			
Collins South of SR 118									X		X		X	X	X	X									X							
Alamos Canyon North of SR 118	X			X	X	X			X	X	X	X	X	X	X	X		X		X	X		X	X	X	X	X	X			X	X
Alamos Canyon South of SR 118			X						X	X	X	X	X	X		X			X				X	X	X	X	X	X	X	X	X	X
Simi Valley Landfill North of SR 118						X	X		X	X	X			X		X													X			
Simi Valley Landfill South of SR 118		X				X				X				X		X		X	X				X		X					X		X
White Oak Park Open Space North of SR 118	X			X					X	X	X					X																
Hummingbird Creek North of SR 118				X							X		X	X							X		X	X	X					X		
Corriganville Tunnel North of SR 118				X						X		X		X																		
Corriganville Tunnel South of SR 118				X						X		X		X																		

Table C – Ventura 118 Wildlife Corridor Study - Indicators of Target Species Via Scent Stations or General Observations, May 2003 - February 2004

	Mountain Lion				Mule Deer				Coyote				Bobcat				Grey Fox				Raccoon				Opossum				Skunk			
	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04	May-03	Aug-03	Nov-03	Feb-04
Rocky Peak Road North of SR 118						X	X			X	X	X						X	X			X	X									
Rocky Peak Road South of SR 118						X		X		X	X	X				X		X		X		X	X								X	
Iverson Road South of SR 118														X																		
Movie Lane North of SR 118						X																X								X		
Movie Lane South of SR 118						X						X						X		X				X			X	X		X		
Browns Canyon Creek North of SR 118						X	X			X								X						X		X	X	X		X	X	X
Browns Canyon Creek South of SR 118						X		X		X	X	X		X				X	X			X	X	X		X	X	X		X	X	

Note: "X" indicates that that species was determined to be in the area by one of the following: Scent Station Data or General Observations (Scat, Tracks, Scent, and Direct Observation).

For more detailed information regarding frequency of Target Species visits, please see the quarterly reports.

Shading represents a tracking station that was not installed or was stolen at the crossing.

**Table D – Other Regional Wildlife Movement Research Studies along SR-118 Observations of SR-118 Study Target Species
(Mountain Lion, Mule Deer, Coyote, Gray Fox, Bobcat, Badger)**

Crossing Location	SMMC 1991	MBA 1993	Ng 2000	Psomas 2002	Bonterra 2003	NPS 2004	Caltrans 2004
Arroyo Simi near Collins Ave			Bobcat		Bobcat		Bobcat
Collins Avenue North - Faulker Canyon			Bobcat		Mountain Lion Bobcat		
Equipment Passage			Coyote Bobcat				
Alamos Canyon Road Undercrossing		Bobcat	Mule Deer Coyote Bobcat	Bobcat			
Alamos Canyon North (and Brea Canyon)				Mountain Lion Bobcat			
Alamos Canyon South		Bobcat					
Simi Valley Landfill Culvert			(Raccoon)				
Hummingbird Creek Culvert			Coyote Bobcat				Coyote Bobcat
Corriganville Tunnel	Mountain Lion		Mountain Lion Mule Deer Coyote Bobcat			Mountain Lion	

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- Bonterra Consulting 2003. Biological technical report for the North Park Village Specific Plan No. 2001-01, Ventura County, California. Prepared for City of Moorpark. Revised June 30.
- National Park Service 2004. Report on mountain lion activity in Simi Hills and Santa Susana Mountains. Email correspondence between Amy Pettler, Caltrans and S. Riley, NPS, on Feb. 20, 2004
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Current Land Use. Development on the northwest side of this crossing consists primarily of single-family residential development and Moorpark College. Southwest of the Collins Crossing, open space extends from Los Angeles Avenue to the Simi Hills. Railroad tracks running parallel to the SR-118 are located between the freeway and Los Angeles Avenue. South of this crossing, development consisting of a mobile home park, water treatment facility, and other light industrial uses occurs on the south side of Los Angeles Avenue, eastward to Oak Park which is located next to Alamos Canyon.

Proposed Development and General Plan Zoning. North Park Village, a 3,544-acre specific plan, is currently in public review. This specific plan would develop the lands north and east of Moorpark College and includes constructing a freeway interchange for a new college entrance road directly off of SR-118. This project is affected by Save Open-space and Agricultural Resources (SOAR) and must be approved by voters through a ballot measure in order to amend the Moorpark City Urban Restriction Boundary (CURB) limits. The proposed specific plan includes dedication of the majority of the northern half of the Plan area as open space and provide for a habitat linkage through Faulker Canyon. Refer to the North Park Specific Plan documents available at the City of Moorpark Department of Planning web site (City of Moorpark 2004).

The parcels of land currently undeveloped at the north end of Collins Tunnel is zoned as rural or open space with one dwelling per 40 acres (City of Moorpark 1992). The parcel is south of the proposed North Park project. A road is proposed through this area as another entrance to Moorpark College with a new SR-118 interchange (BonTerra Consulting 2003).

The land west of Oak Park Campground is zoned as Open Space. Immediately south of Oak Park campground, between Los Angeles Avenue and Arroyo Simi, the land is zoned as Light Industrial/Open Space (City of Simi Valley 1988). A developer has requested changing the zoning to Residential/Open Space in order to build a senior housing tract and golf course on the undeveloped area south of Oak Park Campground (City of Simi Valley 2004a).

South of Los Angeles Avenue, all of the land between Arroyo Simi and Olsen Road is designated Open Space, Parks, and Greenbelts. Open Space areas continue through the City of Thousand Oaks in Santa Rosa Arroyo and through Norwegian Grade to McCrea Wildlife Reserve and Wildwood Regional Park (City of Simi Valley 1988).

Disturbances. As was the case at most of the wildlife crossings near human occupation, vandalism was an issue at the Collins Drive Crossing. However, vandalism at this crossing was restricted only to disturbance of the scent stations, which were easily rebuilt. Some data was most likely lost, but probably only had a minor effect on the outcome of the study. The cameras were not tampered with at this location.

Habitat. Vegetation within the open space northeast of the crossing is primarily made up of California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), chamise (*Adenostoma fasciculatum*), laurel sumac (*Malosma laurina*), and yucca (*Yucca* sp.). Mule fat (*Baccharis salicifolia*) and willows (*Salix* spp.) dominate the Arroyo Simi Wash south of this crossing. Both the north and south sides of SR-118 and Los Angeles Avenue were burned during the October/November 2003 wildfires.

Wildlife Observations. Similar wildlife observations were made at the Collins Drive scent stations during all four quarterly surveys. During the February 2004 survey, the Arroyo Simi scent station south of Collins and west of the creek was moved from the channel to the bank because of inundation from recent rains. Bobcat consistently visited the Arroyo Simi scent stations during each of the four quarterly surveys. Coyote only visited the Arroyo Simi scent stations during two of the surveys.

Bobcats were observed by several researchers in Arroyo Simi, south of Collins Avenue. Sandra Ng (2000), BonTerra Consulting (2003) and by Caltrans biologists during a site visit in 2003 and 2004 (Caltrans 2004).

Besides tracks being identified at the scent stations, raccoons (*Procyon lotor*) were photographed in the Collins Drive Tunnel during the last three surveys. The north channel scent station regularly visited by coyote and raccoon. Tracks at the north utility access road scent station primarily consisted of small mammals and rodents. Animal activity appears to be similar at this crossing before and after the October/November 2003 wildfires. The Equipment Passage could be used by small to large-sized mammals, but no tracks were seen in the vicinity of the entrances during this LSA study.

While conducting a tracking survey for the proposed North Park Specific Plan, BonTerra Consulting biologists observed tracks of mountain lion and bobcat in the wash (Faulker Canyon) north of Collins Avenue culvert (BonTerra 2003). Ng (2000) reported bobcat, coyote, skunk (*Mephitis mephitis*), raccoon, and opossum (*Didelphis virginiana*) tracks at Collins Tunnel and Equipment Passage. Bobcat, rabbit, and raccoon tracks were seen along the dirt road between the railroad and SR-118.

Suitability. The Collins Crossing, located at the westernmost end of the study area, does not provide a viable large-sized mammal habitat linkage between the Santa Susana Mountains and the Simi Hills. The limiting factors include the proximity to single-family housing northwest of the crossing, a large mobile home community to the southeast, and the immediacy of Los Angeles Avenue and the railroad tracks to this crossing. Wildlife trying to pass through the Collins Tunnel crossing is currently constrained by the midway turn in the tunnel, which obstructs the view of the other opening and also the steep reinforced concrete trapezoidal channel that terminates at a six-foot vertical drop structure approximately 300 feet upstream of the undercrossing. South of the undercrossing, the concrete trapezoidal channel extends several hundred feet before terminating into the Arroyo Simi Wash and is enclosed with chain link fence on both banks of the channel. Moreover, the high potential for human and animal interaction make this crossing particularly unfavorable for use by large mammals such as mule deer and mountain lion.

3.1.2 Alamos Canyon

Location. Three potential wildlife crossings were situated within the Alamos Canyon area located at the western end of Simi Valley between Collins crossing to the west and the Simi Valley Landfill crossing to the east.

Description. These three crossings include: 1) Alamos Canyon West, consisting of 10-foot diameter double RCP culverts, extending 816 feet; 2) Alamos Canyon Road underpass; and 3) Alamos Canyon East, consisting of a six-foot diameter RCP culvert, extending approximately 600 feet.

Current Land Use. These potential wildlife crossings were included as part of the study since they are located in the center of the extensive open space areas that extend westward past Collins Drive and eastward toward the Simi Valley Landfill. Oak Park Picnic Area and Campground, west of Alamos Canyon Road, is located in strips of undeveloped land between SR-118 and Los Angeles Avenue. Currently, the park is an impediment to wildlife movement from Alamos Canyon to Arroyo Simi. Wildlife movement to Arroyo Simi is also constrained by development south of Los Angeles Avenue. A cement plant, water treatment facility, and a manufactured home community are located where Alamos Canyon Creek empties into Arroyo Simi. Fencing extends on the south side of Los Angeles Avenue from the mobile home park to the industrial complex is also an impediment to wildlife movement.

Proposed Development and General Plan Zoning. A 2,880-acre residential development, The Canyons, is proposed to be built north of SR-118. A business/industrial complex south of SR-118 has been proposed to the City of Simi Valley Department of Planning (Psomas 2001 and 2002). The project will have designated open space in the canyon areas. At this time, the proposed project design is being revised; therefore, environmental documentation is not available for public review. The land on either side of Alamos Canyon Road south of SR-118 is zoned as commercial and industrial land use by the City of Simi Valley (1988).

Bard Reservoir is now dedicated open space and other open spaces to the west interconnect with Santa Rosa Canyon open space areas to the west and Oak Brook Village open space areas to the south. Development in southwest Simi Hills is limited to completing phases within existing specific plans of Long Canyon Village and Runkle Ranch. Bridle Path is a rural residential exclusive community that caters to equestrian enthusiasts. The City zoned the land as open space with a maximum of 1 dwelling per 40 acres. Other open space areas located south of Simi Valley that are not designated as conservation areas are zoned as open space with 1 dwelling per 40 acres.

Disturbances. Several homeless encampments were scattered throughout Alamos Canyon and a significant amount of dumping occurred south of SR-118. Vandalism was also an issue at Alamos Canyon. The cameras and sensors at the Alamos Canyon Road underpass were stolen during the November survey and not replaced for the remainder of that quarterly survey. Additionally, the scent station located in the northwest canyon was vandalized on several occasions. Cattle were observed grazing within the northwest canyon numerous times during the study.

Habitat. Vegetation north and south of the West Canyon culverts was primarily made up of California buckwheat (*Eriogonum fasciculatum*), sagebrush (*Artemisia californica*), chaparral yucca (*Yucca whipplei*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), willow (*Salix* sp.), and rushes (*Juncus* sp.). Caltrans, in preparation for the post-wildfire storm events, cleaned out the west culverts and removed the riparian vegetation approximately 200 feet downstream (Amy Pettler, Caltrans, pers. comm. 2004). South of the Alamos Canyon Road and the East Canyon culvert, the vegetation within the upland open space primarily consists of California buckwheat, sagebrush, chaparral coyote brush (*Baccharis pilularis*), and yucca. Dominant vegetation in many of the low-lying areas and near the drainages include oak (*Quercus* spp.), mule fat (*Baccharis salicifolia*), elderberry (*Sambucus* spp.), and laurel sumac (*Malosma laurina*). Railroad tracks run parallel to SR-118 between the freeway and Los Angeles Avenue. Both the north and south sides of SR-118 and Los Angeles Avenue were burned during the October/November 2003 wildfires.

Wildlife Observations. Mountain lion tracks were documented at Alamos Canyon during three of the four quarterly surveys (north of the SR-118 in May 2003 and February 2004, and south of the SR-118 in August 2003). Specifically, mountain lion tracks were observed at the northern and southern ends of the West Canyon. Coyotes and bobcats have been observed crossing the creek in front of the northern end of the West Canyon culvert during the quarterly surveys. The presence of both skunk and raccoon had also been documented within the vicinity of the entrance of this passageway. A skunk was captured on film entering the north end of the West Canyon culvert.

Alamos Canyon East culvert linkage provides a CMP culvert crossing for skunk, opossum, and raccoon. Bobcat was frequently observed at the north and south ends of the East Canyon culvert and inside the northern end of the culvert during the quarterly surveys.

On Alamos Canyon Road, coyote and bobcat tracks were observed at the scent stations, along with small mammals and birds. A coyote was captured on film in Alamos Canyon Road underpass. Michael Brandon & Associates conducted a tracking survey for the Alamos Canyon Road Interchange Project (MBA 1993). Bobcat tracks were observed by MBA north and south of SR-118 in the west and east canyons and on Alamos Canyon Road. Sandra Ng (2000) captured tracks by mule deer, coyote, and bobcat under SR-118 at the Alamos Canyon Road underpass. In addition, Psomas biologists frequently observed bobcat tracks throughout north Alamos Canyon and at the road underpass during a tracking survey for The Canyons Specific Plan project (Psomas 2002). Psomas also recorded mountain lion tracks in several locations in the north Alamos Canyon, north of Simi Valley Landfill, and in Brea Canyon.

Suitability. Alamos Canyon provides several areas of high quality habitat needed for life-sustaining activities (e.g., food, cover, breeding, and migration) that are used by medium and large-sized wildlife. Alamos Canyon is one of the potential crossings identified within the study that, if enhanced, could provide a viable wildlife linkage between the Santa Susana Mountains and the Simi Hills. These include Alamos Canyon West and Alamos Canyon Road. Enhancement proposals at Alamos Canyon are discussed in Section 4.0 of this report.

3.1.3 Simi Valley Landfill

Location. The Simi Valley Landfill crossing, located in an unnamed drainage, is the easternmost passageway of the undeveloped area extending from Collins Drive to Madera Avenue.

Description. This crossing consists of a 588-foot long, six-foot diameter reinforced corrugated metal pipe.

Current Land Use. Development in the southern portion of this crossing is limited to utility access roads. Chaparral and oak woodland habitat occurs on the hill sides and in the arroyo south of the landfill. A large commercial/light industrial center is located on the hill southeast of the crossing and across Los Angeles Avenue. North of SR-118, the small canyon contains a large concrete flood control structure and the landfill access road. Adjacent development north of SR-118 consists of the sanitary landfill.

Approximately half of the Whiteface Specific Plan area is dedicated open space. Whiteface is located northeast of Simi Valley Landfill and west of Tapo Canyon Road. The Whiteface open space includes

part of Dry Canyon. Tapo Canyon Regional Park is located at the northern terminus of Tapo Canyon Road. East of Tapo Canyon Road and contiguous with Rocky Peak Park, Marr Ranch open space encompasses the confluences of Tripas, Chivo, and Las Lajas Canyons.

Proposed Land Development or General Plan Zoning. The land between SR-118 and Los Angeles Avenue is zoned as commercial and industrial. The land surrounding Simi Valley Landfill is zoned as open space in the City of Simi Valley General Plan. In 2003, the City authorized the expansion of the landfill in order to extend the capacity of the facility for another 30 years (City of Simi Valley 2004b). This area, previously zoned open space, may be used as part of the landfill expansion.

Brea Canyon is located to the northeast of Simi Valley Landfill. Brea Canyon is currently undeveloped, but the land is included as part of The Canyons project. The project most likely will propose residential development in the upper canyon. The City of Simi Valley General Plan includes road expansions north of the current city limits. Tapo Canyon road would extend in a westerly direction to the proposed North Park Project. Madera Road would extend north and eastward from Los Angeles Avenue to Tapo Canyon Road. Alamos Canyon Road would continue in a northeasterly direction to connect to Madera. These roads would accommodate future development in Alamos Canyon, Brea Canyon, Sand Canyon, Dry Canyon, and Tapo Canyon.

Disturbances. Similar to Alamos Canyon, homeless encampments are also located in the canyon occupying the south end of this crossing. The camera and sensor at the south side of the Simi Valley Landfill were stolen during the November survey, but later recovered by the police and reinstalled for use during the remaining quarterly survey period.

Habitat. Vegetation within the open space north of the crossing was primarily made up of California buckwheat, sagebrush, chaparral yucca, coast live oak (*Quercus agrifolia*), mule fat, elderberry, and laurel sumac. The flood control dike is planted with native shrubs and is regularly watered by a temporary irrigation system. South of the Simi Hills Landfill crossing, vegetation primarily consists of California buckwheat, sagebrush, and coast live oak. There are hills to the northwest and southwest of the crossing that are covered in sage scrub. Only the north side of SR-118 was burned in this area during the October/November 2003 wildfire.

Wildlife Observations. During the quarterly surveys, the following wildlife observations were made. At the Simi Valley Landfill culvert, mountain lion has been documented on the south side, whereas coyotes and bobcat have been documented within the vicinity of both the north and south entrances. Mule deer tracks have also been observed both north and south of this passageway. The Simi Valley Landfill culvert provides a CMP culvert crossing for skunk, opossum and raccoon. Skunk and raccoon have also been documented within the vicinity of the entrances of this linkage. Sandra Ng (2000) did confirm a raccoon using the culvert to cross under SR-118 during her wildlife movement study.

Suitability. This passageway is not a high priority due to its close proximity to urbanization. Consideration must be given to encouraging mountain lion movement to persist in this drainage location since it is in close proximity to urbanization. On the other hand, the land use in this area is light industrial; therefore, human activity is primarily during the day and would not conflict with nocturnal wildlife movement. A linkage to Brea Canyon could have been incorporated into the

freeway interchange design. However, Brea Canyon is blocked by fencing, small pipe culverts, and a vertical down drain.

3.1.4 White Oak Park and Hummingbird Creek

Location. The scent stations at White Oak Park and Hummingbird Creek are located in an undeveloped, although highly disturbed recreational area on the north side of the SR-118 to the west and east of Kuehner Drive, respectively. Due to the extent of development along Kuehner Drive south of SR-118, scent stations were not set on the south side of the freeway. Hummingbird Creek flows under SR-118 starting as a natural channel then is converted to a trapezoidal concrete-lined channel. The concrete arch culvert under SR-118 is 450 feet in length and 12 feet in height and width.

Description. These stations represent the western end of the eastern undeveloped area spanning from Kuehner Drive in the City of Simi Valley, Ventura County, to Browns Canyon Road in Chatsworth, Los Angeles County at the eastern end of the study.

Current Land Use. Dense residential and commercial development along Kuehner Drive on the south side of SR-118 constrains this area as a viable large mammal crossing. North of SR-118, the land is undeveloped but disturbed. Rocky Peak's westernmost boundary is along North Kuehner Drive. The Hummingbird Creek connector trail to Rocky Peak begins at the Kuehner Drive/SR-118 intersection. East of Kuehner Drive and one-half mile south of SR-118, Hummingbird Trail continues from Foothill Park at the west side of Corriganville Park.

Proposed Development and General Plan Zoning. The remaining pockets of undeveloped land between developed land in the City of Simi Valley and the west side of Rocky Peak Park are zoned for urban development.

Disturbances. This area is severely impacted by human activities including hiking, mountain biking, and off-road vehicle use. Road improvements on Kuehner Drive and Mount Sinai Drive, north of SR-118, were ongoing during the study. Camera stations in Hummingbird Creek culvert were not included because the ceiling was too low and there was significant vandalism in the culvert.

Habitat. Oak savanna and chaparral typifies the upland vegetation associated with the open space north of SR-118. Mule fat, mixed willow, and Fremont cottonwood (*Populus fremontii*) dominate the Hummingbird Creek drainage. The area north of SR-118 burned during the October/November 2003 wildfires.

Wildlife Observations. Mountain lion visited White Oak Park during the study on two occasions (May 2003 and February 2004) and visited Hummingbird Creek once during the February 2004 survey. Tracks of other wildlife species of interest observed at these stations include coyote, bobcat, raccoon, opossum, and skunk. Animal activity appears to be similar at this crossing before and after the wildfires.

Sandra Ng (2000) documented coyote and bobcat use of the Hummingbird Creek culvert. Caltrans biologists observed bobcat and coyote tracks on the south side of the Hummingbird Creek culvert in January 2004 (Personal communication with Amy Pettler, Caltrans, 2004).

Suitability. The Hummingbird Creek culvert could be used to skirt around the development and enter the west side of Corriganville Park, but is not a viable large mammal linkage to areas directly south of SR-118 because of the dense urban development. The culvert is large enough for deer and mountain lion and is known to be used by coyote and bobcat. The highway fence could be relocated and replaced with wildlife fencing to allow animals to reach Corriganville Park from the west.

The White Oak Park and Hummingbird Creek Trail areas are an important contribution to the open space areas located north of and parallel to SR-118, since it is contiguous with Rocky Peak Park to the east. The White Oak Park and Hummingbird Creek area has the capacity to be enhanced through the restoration of natural vegetation but needs to be protected from off-trail human disturbance.

Caltrans is planning to install a vertical pipe debris collection rack. The rack will be placed in front of the northern end of Hummingbird Creek culvert (personal communication with Amy Pettler, Caltrans, April 2004). Any highway infrastructure or storm drain improvement at Hummingbird Creek needs to accommodate large and medium-sized wildlife movement in the channel. Native vegetation must be allowed to persist along the creek and in the highway right-of-way to provide wildlife habitat and cover.

3.1.5 Corriganville Park Equestrian Tunnel

Location. Corriganville Park is located south of SR-118 and extends from eastern Simi Valley to the Los Angeles County line. The park was Corriganville Movie Ranch prior to 1966. The land now functions as a 250-acre nature preserve. Access to Rocky Peak Park, which is north of SR-118, is through a large equestrian tunnel, which is referred to in this study as the Corriganville Equestrian Tunnel. The parks are used recreationally by hikers, bicyclists, equestrians, and youth groups. In addition, the parks provide habitat for wildlife, including large mammals such as deer and mountain lion.

Description. The equestrian tunnel is a large concrete box culvert. The length is 190 feet. The height and width are 16 feet. The approach into the tunnel is a gradual incline from the south. North of SR-118, the trail meanders uphill between rock outcrops. Camera and scent stations were installed north and south of SR-118.

Current Land Use. The land southeast of Simi Valley and in Ventura County has been built out as proposed in the City of Simi Valley General Plan (1988). The residential projects in Box Canyon and Black Canyon have been built. Designated open space areas include land associated with the projects in Black Canyon, Rocky Pointe Park, Santa Susana Park, and Sage Ranch. Approximately 3,000 acres of institution-owned land is currently undeveloped. The property is owned by the Brandeis-Bardin Institute (BBI). Bell Canyon and Bell Canyon Park are dedicated open space areas southwest of Chatsworth Reservoir. Chatsworth Reservoir has been designated as a nature reserve. The majority of the land on the southern slopes of the Simi Hills has been dedicated to the Santa Monica Mountains National Recreation Area. These include the Palo Comado, Cheeseboro, and Las Virgenes Canyons, Jordon Ranch, and Ahmanson Ranch. North Ranch, Lang Ranch, Wood Ridge, and Wood Ranch dedicated open space in the southwest Simi Hills region.

Proposed Development and General Plan Zoning. The BBI campus is located at the southern terminus of Tapo Canyon Road. The campus is zoned urban residential and the remaining land is

zoned open space. The land surrounding Runkle Reservoir is located within the City of Simi Valley CURB limits. A development proposal for Greenpark Village Runkle Canyon Specific Plan has been submitted to the City for approval to develop the land around Runkle Reservoir. A General Plan Amendment would be required prior to building approval. This proposed development encompasses 1,600 acres with 1,150 acres of natural open space (Runkle Canyon Neighbors 2003). The undeveloped land south of Boeing/Northrop Rocketdyne facility and north of Bell Canyon is zoned for a business park. An extension of Sequoia Avenue is proposed by the City of Simi Valley from the proposed GreenPark development to the Rocketdyne facility.

Disturbances. Land disturbance is minimal in Corriganville Park, with the exception of the trail and the parking lot at the base of the hill. Recreational use is high at this crossing. During the second quarterly survey, the cameras were stolen and not replaced for that quarterly survey. The cameras were not tampered with during in the third and fourth surveys.

Habitat. The hills are covered with coastal sage scrub. Laurel sumac and yucca are scattered throughout the hills. Both sides of SR-118 burned during the October/November 2003 wildfires.

Wildlife Observations. Corriganville Tunnel was a study location during the second, third and fourth quarterly surveys. Only domestic dog (*Canis domesticus*) tracks were captured at the scent stations during the second survey. Only hikers and mountain bikers were observed during the third survey. Coyote, dog, and mountain lion tracks were seen at the scent stations during the fourth survey.

Mountain lion tracks were found at the scent stations during the station inspections on February 7 and 9, 2004. Also, the mountain lion was captured on film on February 8. It was a mountain lion that had been radio-collared as part of a National Park Service study.

This young male has used the equestrian tunnel to cross SR-118 at least six times from September 2003 through February 2004 (Personal communication between Amy Pettler, Caltrans and Seth Riley, NPS, February 20, 2004). Mountain lion tracks were observed at the Corriganville Tunnel by SMMC in 1991 and by Ng in 2000. Sandra Ng also documented in her thesis that mule deer, coyote, and bobcat also use this crossing.

Suitability. The Corriganville equestrian tunnel and surrounding park lands are ideally suited for large mammals crossing SR-118. Over the past 15 years, wildlife studies at this tunnel have demonstrated that mountain lions use this linkage to move between the Simi Hills and the Santa Susana Mountains. The City of Simi Valley has approved the construction of improvements at Corriganville Park. To maintain the function of this passageway as a wildlife linkage, the park facilities need to remain rustic without overnight lighting, retaining the dirt parking lots, without fencing that would block large mammals moving through the park, and limit recreational activities to day use. Currently, the only improvements done at the park was installation of temporary restrooms, security fence, water fountains, information booths, caretaker living quarters, storage building, parking lot grading, and general clean-up (Personal communication with Edward Hayduk, RSOSCA, March 2004). No further work is planned, since funding is not available at this time. The Simi Sunrise Rotary Club and Rotary Club of Simi Valley had built a youth campground in the east end of the park. This campground is used regularly by scout troops. Overnight camping can disrupt wildlife movement through the park lands.

3.1.6 Rocky Peak Road

Location. Rocky Peak Road is located approximately 1.2 miles west of Iverson Road and approximately 0.5 mile east of the Corriganville Equestrian Tunnel.

Description. Rocky Peak Road is a paved roadway that crosses over SR-118 as a bridge structure. The overcrossing measures 60 feet in width and approximately 130 feet in length. Rocky Peak Road extends north to south over SR-118, connecting to Santa Susana Pass Road at the southernmost limits. Rocky Peak Road is currently accessed from SR-118 via the westbound off-ramp lane of the highway. Access to SR-118 from Rocky Peak Road is limited to the eastbound on-ramp.

Current Land Use. Rocky Peak Road overcrossing is located in Santa Susana Pass Wildlife Corridor. The overcrossing connects Santa Susana State Historic Park and SMMC Rocky Peak Park. The overcrossing is part of the Rancho Simi Recreation and Parks regional trail system. The Stage Coach Trail starts at the south end of Rocky Peak Road and then joins the Wildlife Corridor Trail in Corriganville Park. Rocky Peak Trail starts at the north end of Rocky Peak Road. A dirt parking lot provides limited parking for the public at the north end of Rocky Peak Road. The southern end of the road also provides a pull-out area from Santa Susana Pass Road which is used for public parking as well.

Proposed Development and General Plan Zoning. The undeveloped parcels east of Rocky Peak Park and west of Browns Canyon are zoned Non-Urban by the County of Los Angeles. The parcels are also located within a County of Los Angeles Significant Ecological Area (County of Los Angeles 2003). Land within an SEA may be developed; however, the County requires that additional environmental review procedures be followed during the development approval process. All of the land south of SR-118 and within the City or County limits of Los Angeles is either built out or dedicated as parks and open space. Land use south of SR-118 and east of the Ventura County line will not change to any great degree in the future.

Disturbances. Recreation is the only disturbance to the surrounding habitat areas. The passageway and the ramps are used frequently by vehicles. The eastbound off-ramp is used as a Caltrans lay-down yard. Highway fences disrupt wildlife movement in the arroyos between SR-118 and Santa Susana Pass Road. Cameras were tampered with during all four quarterly surveys. The cameras were removed for one survey night during the first survey and then remounted for the remaining time of the survey. The cameras were vandalized but not stolen during the second and third survey, and one camera was stolen during the fourth survey.

Habitat. Habitat at Rocky Peak Road comprises California sagebrush vegetation community and chamise chaparral. This habitat is abundant on the north and south sides of SR-118. However, the vegetation in the area immediately adjacent to the roadway is disturbed. Only the north side of SR-118 was burned during the October/November 2003 wildfires.

Wildlife Observations. In the vicinity of Rocky Peak Road overcrossing, coyotes and bobcats have been documented during the quarterly surveys along the hiking trails north and south of SR-118. Other wildlife that has been documented at the scent stations at both the north and south sides of the overcrossing include opossum, raccoon, and skunk. Larger mammals were not observed at the scent stations. No small, medium or large mammals were observed by the video or 35mm cameras at the

overcrossing. However, throughout each survey during the study, cameras captured vehicles on the overpass. Equestrians, hikers, and cyclists with dogs were common at this crossing.

Caltrans biologists observed mule deer at Rocky Peak Road during the past three years of field surveys (personal communication with Amy Pettler, Caltrans, April 9, 2004). The deer crossed Santa Susana Road and entered the arroyo located southwest of the overcrossing. They also walked across the proposed eastbound off-ramp site.

Suitability. The surrounding habitat is used by deer, coyote, and bobcat. The in-fill areas for the ramps are used by target species. This crossing could be used by target wildlife species with enhancements. Currently, the narrow two-lane bridge and the existing disturbed conditions of the approach areas coupled with the frequent presence of vehicles using this crossing hinder safe access to the crossing and use of the overpass by wildlife. Enhancement options explained in Section 4.0 are recommended to encourage the use of the bridge as a wildlife crossing.

3.1.7 Santa Susana Arch

Location. Santa Susana Arch is located approximately one mile east of Rocky Peak Road near the Ventura-Los Angeles County boundary.

Description. Santa Susana Arch is a long concrete pipe culvert with a flat bottom. It is approximately 500 feet long, six feet in width, and five feet in height. The arch is at the base of a steep canyon north of Santa Susana State Historical Park and south of Joughi Open Space (pending dedication).

Current Land Use. Residential development north of SR-118 is being built east side of the north canyon. Rocky Peak Park and Joughi Open Space are located on the west side of the canyon. Another open space park, the Santa Susana Mountains State Historic Park, is located south of the arch. The deep canyon is secluded from adjacent development on the north side of SR-118 and there is no development adjacent to the canyon south of SR-118 and Santa Susana Pass Road.

Proposed Development and General Plan Zoning. The County of Los Angeles General Plan had the lands north of SR-118 designated as Non-Urban or Rural with the exception of the Porter Ranch Specific Plan. A new open space area, Joughi Park, is pending dedication. This park is in the canyon between Rocky Peak Park and Devils Canyon. All lands south of SR-118 have been built out or dedicated as open space or parks.

Disturbances. Access to this canyon is difficult due to the steepness of the slopes and due to the abundance of poison oak (*Toxicodendron diversilobum*) at the entrances of the arch. Therefore, disturbance from humans does not occur often at this crossing. Caltrans was proposing an installation of a drop structure at the north end of the arch, but since this arch is frequently used by raccoons to cross under SR-118 another structure was installed farther upstream instead (personal communication with Amy Pettler, Caltrans, January 2004).

Habitat. The canyon is occupied by coast live oak, sycamore (*Platanus racemosa*), cottonwood, laurel sumac and other coastal scrub species. The habitat areas are relatively undisturbed in the canyon itself, but residential development is encroaching upon the open space area north of SR-118. The north side of SR-118 burned during the October/November 2003 wildfires.

Wildlife Observations. Raccoons were captured on film during all four surveys. The raccoons used the arch two to three times during each five-day survey period. Mice and rats were photographed at the entrances of the arch.

Suitability. This wildlife passageway is used frequently by raccoons to cross under SR-118. It is unfortunate that this structure was not constructed large enough to accommodate large mammals, since it is located between large open space areas, Rocky Peak Park, Joughi Open Space and Santa Susana Mountains State Historic Park. Tunnel-jacking a larger culvert with an earthen bottom into this crossing would make this passageway more desirable to medium- and large-sized mammals.

3.1.8 Iverson Road

Location. Iverson Road is located one mile east of Rocky Peak Road. The freeway undercrossing is a two-lane road beginning at Santa Susana Pass Road and ending at a gated private community, north of SR-118. After the first quarterly survey, a scent station was installed on a hilltop southwest of the Iverson Road undercrossing in order to capture any wildlife movement through the sage scrub habitat south of SR-118 along Iverson Road.

Current Land Use. A telecommunications tower and temporary utility cabinets are installed on the ridgeline of the hill which parallels SR-118. A church parking lot is also constructed west of Iverson Road directly across from the church compound located on the east side. North of SR-118 is a large gated private residential community.

Proposed Development and General Plan Zoning. The currently undeveloped land located west of Iverson Road is zoned by the City of Los Angeles to be Residential Single-Family. The Santa Monica Mountains Historic State Park is located south of Santa Susana Pass Road at this location.

Disturbances. The scent station was vandalized during the fourth survey. A newly cut dirt road and trench was created on the ridge in order to install utility service to the telecommunications tower approximately 200 feet east of the scent station.

Habitat. The hilltop southwest of Iverson Road underpass is drier than the surrounding area. California buckwheat, sagebrush, chamise, and chaparral yucca are present on the ridge. The chaparral continues down to Santa Susana Pass Road on the west side of Iverson Road. The October/November 2003 wildfires did not burn south of SR-118 at this location.

Wildlife Observations. During the second quarterly survey, a bobcat visited the scent station. The other two surveys captured tracks of small rodents and birds.

Suitability. Wildlife cannot move from the north to the south side of SR-118 because of the gated residential tract on the north side of SR-118. Only a narrow strip of habitat in the right-of-way extends to the north Garden of the Gods open space. Along the south side of the freeway, pockets of undeveloped land surround a church property on Iverson Road and continue across to Santa Susana Pass Road.

3.1.9 Movie Lane

Location. Movie Lane is located approximately 0.5 mile east of Iverson Road and approximately one mile west of Canoga Street. Movie Lane is a paved roadway that crosses over SR-118 as a bridge structure. The overcrossing measures 60 feet in width and approximately 130 feet in length.

Description. Movie Lane extends west off of Poema Place as a private access road behind an apartment complex on the north side of SR-118. Access to the bridge is via a locked gate and an abandoned paved road. From there, the road continues west through a previously developed area (possibly an old home site) for which the road was created, but has since been abandoned.

Current Land Use. Dense multifamily and single-family residences exist north and south of this crossing. There are chaparral and eucalyptus trees in the right-of-way northwest and southwest of Movie Lane. Garden of the Gods Park is located south and north of SR-118. The Movie Lane Overcrossing can be used by pedestrians to visit the twin park sites. Wildlife cannot access to two park sites, since they are separated by the high density housing tract south of SR-118.

Proposed Development and General Plan Zoning. The land is currently built out on both sides of Movie Lane Overpass.

Disturbances. Appliances and other debris are piled in the abandoned building site and road banks. The cameras were tampered with during the first quarterly survey.

Habitat. The vegetation on the south side of the overcrossing approach is also disturbed. The property and road are now dominated by non-native grasses and weed species. Near the approach of the overcrossing, the same non-native grassland species have colonized on the south side of the roadway and is growing in the bridge expansion joints. A sliver of chaparral continues along SR-118 to the west, but is isolated from nearby open space areas by highway fencing. Vegetation to the north is composed primarily of annual grasses, disturbed upland sage scrub, and eucalyptus trees (*Eucalyptus* spp.). Garden of the Gods Park sites did not burn north or south of SR-118 at Movie Lane in October/November 2003.

Wildlife Observations. Wildlife that had been documented at scent stations at both the north and south sides of the overcrossing include small ground squirrels (*Spermophilus beecheyi*), opossum (*Didelphis virginianus*), and bobcat. Large mammals were not observed within the vicinity of the scent stations. No small, medium, or large mammals were observed by the cameras at the overcrossing. However, throughout each survey during the study, cameras captured residents utilizing the crossing for leisurely walks with dogs, children, and babies in strollers. Runners were also common at this crossing, as well.

Suitability. Suitable habitat is present north of the Movie Lane crossing that would support a variety of wildlife species. However, the north and south side of the Movie Lane crossing roadway dead-ends into human habitation or isolated pockets of sage scrub habitat. Also, wildlife movement along the right-of-way is blocked by chain link fences. Medium-sized mammals may utilize the overpass as a crossing; however, it is not likely that large mammals would use the crossing because of the close proximity to development and various fences. In addition, the Movie Lane crossing does not provide an unconstrained linkage to suitable habitat that would support populations of large mammals. Consequently, this crossing is not a viable wildlife corridor for large mammals.

3.1.10 Canoga Avenue

Location. The Canoga Avenue undercrossing is located at the northern terminus of Canoga Avenue in the community of Chatsworth. Canoga Avenue is approximately one mile east of Iverson Road and one-quarter mile west of Browns Canyon and De Soto Avenue. Canoga Avenue crosses under SR-118.

Description. The underpass was built as a trapezoid bridge. The height of structure is 17 to 20 feet, the width is 85 feet at the base and 170 feet at the top, and the length is 132 feet. The area beneath SR-118 at this location consists of a section of Canoga Avenue that is buffered along its length on both east and west sides by an approximately 20-foot wide dirt shoulder.

Current Land Use. The street pavement ends on the north side of SR-118. From there, a private road continues up the hill into a low-density rural residential community. Santa Monica Mountains Conservancy Park and Open Space (Devil's Canyon and Browns Creek) is accessible from the terminus of Canoga Avenue. Rancho Simi Recreation and Parks District maintains two equestrian trails at this crossing. One trail is parallel to and another trail crosses Canoga Avenue diagonally from southwest to northeast under SR-118. These trails connect Devil's Canyon located north of SR-118 to Stoney Point Park located south of SR-118.

Proposed Development and General Plan Zoning. Undeveloped land is located diagonally across Canoga Avenue Underpass. Devil's Canyon Park is located northeast and undeveloped land is located southwest. The City of Los Angeles General Plan shows that the land southwest of Canoga Avenue is not designated as a recreation or an open space area. Actually, this land has been dedicated to the Santa Monica Mountains Conservancy and is part of the Rancho Simi Recreation and Park District trail system.

Disturbances. During the study, equestrians and hikers were common at this crossing. Vandalism was a problem at this location. Video cameras were installed in order to compensate for frequently passing vehicles triggering the cameras, but this type of camera set up was very attractive to thieves. During the first survey, only the camera settings were changed overnight, but during the second and third surveys, people attempted to remove and steal the cameras. Only one passive sensor and 35mm camera was installed at this crossing during the fourth survey. Scent stations were not used at this crossing because it was thought that the stations would be disturbed frequently due to the high level of visitation by hikers, equestrians, and accompanying dogs.

The current fencing configuration restricts potential wildlife travel between Devil's Canyon and Stoney Point Park. Canoga Avenue and the adjacent dirt shoulder do not provide cover for wildlife and experience high amounts of automobile, equestrian, and pedestrian traffic. In addition to the obstacles for wildlife movement, the underpass is frequented by loiterers and is utilized as a dumping site for residential refuse. These activities usually occur at night when local wildlife would be most likely to use the corridor. Wildlife of concern in this study is averse to these types of human disturbance and the distance it must travel through the corridor without suitable cover.

Habitat. The Canoga Avenue undercrossing is located between high-quality habitat in Devil's Canyon located north of SR-118 and Stoney Point Park located south of SR-118. The area is occupied

by coast live oaks, laurel sumac, chamise and sage scrub. The park areas north and south of SR-118 did not burn during the October/November 2003 wildfires.

Wildlife Observations. Ground squirrel was the only wildlife was captured on film at this crossing. Data that were collected from the camera setups consisted primarily of vehicular and pedestrian traffic; no target species were observed via these methods. LSA biologists searched for scat and tracks along the equestrian trails during one of the site visits. Coyote and bobcat sign were observed.

Based on observations gathered at Browns Canyon, bobcat and coyote are present in the adjacent open space and possibly crossed under SR-118 at this location. This crossing is probably too constrained by development for mountain lion use. However, conversation between LSA biologist, Leo Simone, and a long-time resident revealed that mountain lion had been seen using this crossing 15-20 years ago.

Suitability. This crossing could be a viable wildlife linkage for medium-sized mammals, such as bobcat and coyote. Improvements could be made at this crossing to accommodate equestrians, hikers, and wildlife. The equestrian trail pole fence could be extended under the bridge on both sides of the road and boulders could be placed along the pavement edge to provide cover for small and medium-sized mammals. Lighting under the bridge could be removed.

3.1.11 Browns Canyon

Location. Browns Canyon is located west of De Soto Avenue in the City of Los Angeles and west of Browns Canyon Road within Los Angeles County.

Description. This potential wildlife crossing was included as part of the study due to the extensive riparian habitat near the freeway and because the viaduct over the wash isolates the freeway from the canyon below. The viaduct over Browns Canyon is estimated to be over 100 feet above the wash with a 400-foot span. The freeway is 130 feet wide at this location.

Current Land Use. Wildlife movement parallel to SR-118 from Browns Canyon to Limekiln Canyon is now disrupted by an extension of tract housing in the Porter Ranch Specific Plan. Porter Ranch Specific Plan encompasses Browns Canyon. Tract housing has been constructed on the east slope of the canyon within the past three years. This land was located in a Significant Ecological Area of the County of Los Angeles General Plan (2002). Sections of the canyon will be set aside for conservation as part of U.S. Army Corps of Engineers permit authorization. The land will be dedicated as Open Space to the Santa Monica Mountains Conservancy (SMMC 2004). South of SR-118, the community of Chatsworth has been densely developed for decades.

Proposed Development and General Plan Zoning. Additional development in the Specific Plan area is approved for the hills east of Browns Canyon between SR-118, Porter Ranch Road, and the northern limits of the City of Los Angeles.

Disturbances. The wash is easily accessible by people from the terminus of De Soto Avenue. Hikers use the trails and spend time where the creek flows over the dike. Vagrants also use the area. A makeshift camp is located at the base of the dike north of SR-118. Equestrian use is frequent. Equestrians travel between the open space in Browns Canyon and Devil's Canyon recreational areas

located north of SR-118. An equestrian/hiking trail traverses the canyon slope northwest of the dike. There is no trail system connecting the equestrian areas south of SR-118 with the open space areas north of SR-118 at Browns Canyon. Access to the hiking trails is from Canoga Avenue.

Habitat. Browns Canyon headwater originates from the base of Oat Mountain in the Santa Susana Mountains north of the City of Los Angeles. The wash is converted to a concrete flood control channel south of SR-118. Browns Canyon Wash is a tributary to the Los Angeles River and Sepulveda Basin. North of SR-118, the canyon supports mature riparian woodland. Dominant tree species are sycamore (*Platanus racemosa*), cottonwood, and willow. North of SR-118, the span of woodland habitat across the canyon is approximately 500 feet. Browns Canyon did not burn during the October/November 2003 wildfires.

Wildlife Observations. The freeway, flood control structures, and the dike in Browns Canyon block movement by humans and large mammals under SR-118. Wildlife movement is also hindered by the dense development south of SR-118. Small and medium-sized mammals were observed in the channel under SR-118. These included bobcat, coyote, skunk, opossum, ground squirrels, rabbits, and small rodents. Large mammals were not observed near the freeway at Browns Canyon. Domestic dog sign was frequently seen at this study location.

Suitability. Although this passageway is not a viable large-sized mammal linkage under SR-118, Browns Canyon is an important area for wildlife movement, including large mammals, north of and parallel to SR-118. The mature riparian habitat within the wash and the upland sage scrub habitat provide additional habitat areas that are contiguous with the Santa Susana Mountains to the north and the foothills and arroyos to the west in the Devil's Canyon, Joughi Open Space, and Oat Mountain.

3.2 ASSESSMENT OF SURVEY TECHNIQUES

The following assessment identifies the limitations of the wildlife study and, where practicable, includes recommendations for procedural changes to be incorporated into future studies.

3.2.1 Vandalism

Vandalism and theft were constant problems throughout the study and occurred during each of the quarterly surveys. Cameras and sensors were either stolen or tampered with at eight of the twelve crossings. Several of the scent stations were also vandalized. This included theft of curb stakes and bait bags, destruction of tracking medium, and foreign objects left at these locations.

It is impossible to know how much data was lost due to vandalism. In most cases, when camera and sensor equipment were stolen, that equipment was not replaced for the remainder of that particular quarterly survey. When the cameras were tampered with, but not actually stolen, often they were left in place, repaired and not removed. The exception to this was tampering of the video cameras at Rocky Peak Road and Canoga undercrossing during the November survey. In that case, the video cameras at Canoga Avenue were removed and at Rocky Peak Road, they were replaced with 35mm passive cameras. Camera and sensor equipment theft and vandalism may have been reduced if the equipment was encased in a tamper-proof metal housing and longer anchor bolts.

3.2.2 35mm Camera Stations

In addition to vandalism and theft, several other complications were experienced with the 35mm cameras and sensors. Malfunctions associated with wind, rain, or other technical difficulties were experienced at many of the stations. This included camera film not advancing, cameras not coming out of sleep mode, and sensors either over- or under-activating. In many cases, changing the battery in the camera would resolve the problem. Moisture was a constant problem, even though the cameras were designed to be water-proof, and often shorted-out the battery. On occasion, it was necessary to replace the camera. Changing the battery in the sensors sometimes would rectify the malfunctions in those units; however, not as frequently as the cameras. At other times, relocating the sensor or clearing additional vegetation from the area was sufficient.

The video cameras at Canoga and Rocky Peak were replaced with 35mm cameras during the February 2004 survey due to vandalism during the previous surveys. The 35mm cameras were programmed to begin operating at 10:00 p.m. in order to reduce the amount of vehicle traffic captured on film. The film was limited to 27 exposures. Images taken by the 35-mm cameras were of better quality than the videotape and the captured images were easier to review.

3.2.3 Video Camera Stations

The greatest data collection difficulty was associated with the video camera equipment at the Canoga undercrossing and Rocky Peak overcrossing. This included 1) the video not turning on and off as programmed; 2) tampering with video equipment at both Canoga and Rocky Peak; 3) high automobile trip rates; 4) insufficient lighting; 5) removal of camera equipment at Rocky Peak by police, and 6) active/passive sensor relay required reprogramming or resets.

Permanent tamper-proof mountings for the video cameras and sensors may have reduced the risk of theft and vandalism. Even though heavy chain was used to secure the cameras to their mounts access to the video cameras was a simple matter of removing six small screws from the front of the video camera housing. Video sensors were placed in areas that were easily accessible. Fortunately, theft was only limited to one set of active sensors from Canoga Avenue.

Video cameras were used at both Rocky Peak and Canoga because of the high amount of vehicle traffic at these locations. Nighttime operations of the video cameras were hampered by a lack of sufficient ambient lighting. At Rocky Peak, several attempts were made to increase the amount of ambient light, including adding small pin-lights and moving the video camera at the south side of the passageway closer to an existing streetlight. The video cameras were occasionally activated during the time of darkness with no observable images. If wildlife was using the passageways, not enough ambient light was present to make an identification.

During the May survey, the video equipment was removed from Rocky Peak by the California Highway Patrol. During subsequent studies, Caltrans notified the appropriate law enforcement agencies that the surveys were taking place.

The video equipment, especially at Canoga, malfunctioned frequently. These malfunctions were most likely associated with the active/passive sensor connections. Often reprogramming the sensors would

temporarily fix the problem, only to have it malfunction one or two days later. It may have been an equipment compatibility issue, but the actual cause was never determined.

Instead of video cameras, a suggestion for monitoring at bridge crossings is to use several 35mm cameras with staggered photo periods. The cameras should be housed inside weld-mounted or bolt-anchored metal boxes.

3.2.4 Scent Stations

Vandalism was an issue at many of the scent stations throughout the urbanized area of the study. Generally vandalism was restricted to disturbing the tracking medium by people walking through the scent station. On other occasions the scent bags and curb stakes were removed. Vandalism may have been reduced if the scent stations were located in more remote locations. However, wildlife tends to use well-traveled trails and placing the scent stations away from these trails may have resulted in fewer wildlife visits. Wind was a major problem at several of the scent stations that were placed in open exposed locations. The results of the wind often obscured many of wildlife tracks. Wildlife was also responsible for removing or destroying many of the scent bags in order to retrieve the bait inside. Canine, skunk, and raccoon were the most common species involved in damaging or removing the scent bags.

3.2.5 Additional Camera and Scent Station Locations

After reviewing the results of the year-long wildlife study, it was determined by the project team that additional scent stations and camera stations would have been helpful in determining wildlife usage. Scent stations could have been placed at Canoga near the equestrian trails on the north and south sides of SR-118. The scent stations at Browns Canyon were too exposed and subject to a significant amount of human traffic. It may have been beneficial to relocate the scent stations further to the north of the Caltrans right-of-way. An additional set of camera stations at the Simi Hills Landfill on the Westhills Court overpass could have provided additional data from that area.

Other pipe culverts (36- to 48-inch diameter) under SR-118 between Collins Drive and Alamos Canyon Drive could also provide linkages for small and medium-sized mammals. The "Lagon Road" 48-inch concrete pipe is located an estimated 0.75 mile east of Alamos Canyon Road. This culvert had tracks in the mud inside the culvert opening on the south side of SR-118. A bobcat and a large raccoon used the 1-foot to 2-foot wide channel to walk through the grassland area between SR-118 and Los Angeles Avenue. LSA biologists visited this culvert during a site visit in February 2004. Caltrans had recently cleaned out the collected sediment from the debris trap on the south side of SR-118.

Camera and scent stations in potential at-grade road crossing locations to capture wildlife activity would have been informative in determining viable linkages. It would have been helpful to know how the mountain lions traveled across Los Angeles Avenue and through the undeveloped land in between SR-118 and Los Angeles Avenue. Lion tracks were observed south of SR-118 from Alamos Canyon to Simi Valley.

Tracking medium or track plates needed to be placed in the center of some of the long culverts in order to definitively determine whether animals traveled from one opening to the other. These culverts were at Alamos Canyon West, Alamos Canyon East, and Simi Valley Landfill. Additional scent or camera stations placed in the center of the passageway would have been helpful, but could not be accomplished because people or vehicles used the passageways. These passageways were Equipment Passage, Alamos Canyon Road, Hummingbird Creek, Corriganville Tunnel, Movie Lane, Canoga Avenue, and Rocky Peak Road.

Metal track plates could have been tried, but other research studies reported that some species can be suspicious of this type of bait station. More field time should have been dedicated to walking transects along trails, streams and dirt roads to search for wildlife sign, instead of spending time maintaining and securing camera stations at the crossings with high human activity.

3.3 ASSESSMENT OF RESULTS

The purpose of this research study was to determine whether the bridges and culverts along SR-118 from Moorpark to Chatsworth facilitate present and future wildlife movement between Simi Hills and the Santa Susana Mountains. The following is a discussion of the reliability of the wildlife tracking survey results.

The use of the metal pipe culverts, longer than 200 feet in length, by any animal could not be determined. Bobcat and other animals entered the culverts at least 50 feet, but whether they continued through the entire length of the culvert is unknown. Bobcat tracks at Alamos Canyon East culvert indicate that this species most likely did use this linkage to move under SR-118 or there were bobcats occupying two separate territories at opposite ends of the culvert. Ng (2000) reported that raccoon used the pipe culvert at Simi Valley Landfill.

Based on data reported in the literature, bobcats are comfortable using culverts at least three feet in diameter and have used culverts 200 feet long (Cain 1999). A dispersing juvenile mountain lion repeatedly used an 8-foot by 10-foot by 656-foot (2.6m x 3.3m x 200m) box culvert in Coal Canyon (Beier 1995). If the culvert opening is large enough for the target species, then even if the culvert is several hundred feet, the crossing should be functional.

Alamos Canyon East and Simi Valley Landfill are at least 500 feet in length, so distance alone may have discouraged use of these passageways, since the culvert openings were not larger than 8 feet in diameter. The camera problems, vehicle use, and human disturbances at Rocky Peak and Movie Lane were an impediment to wildlife presence or absence data collection at these overcrossings.

The frequency of tracks and the different species observed at the scent stations and camera stations did not change after the wildlife fires in October/November 2003. A male mountain lion monitored by the NPS biologists used Corriganville Equestrian Tunnel before and after the wildfires. The wildfires burned in the Santa Susana Mountains between SR-118 and the Santa Clara River and from Santa Clara River to South Mountain. The fire burned on both sides of SR-118 at Collins Avenue, Alamos Canyon West, and Corriganville Park. The wildfire burned north of SR-118 at Alamos Canyon Road, Alamos Canyon East, Simi Valley Landfill, Hummingbird Creek, Rocky Peak Road, and Santa Susana Arch. The fire did not burn next to the highway at Iverson Road, Movie Lane, Canoga Avenue, or Browns Canyon.

4.0 DISCUSSION

4.1 CROSSING-SPECIFIC ENHANCEMENT PROPOSALS

Corriganville Park Equestrian Tunnel and the surrounding undeveloped area is the only existing crossing (linkage) that has been proven by this study and several other previous research projects to function as a large mammal corridor between Simi Hills and the Santa Susana Mountains. Specific enhancement proposals to ensure the future viability of this crossing and function of the Santa Susana Pass wildlife corridor are discussed below.

The structures at the following crossings have been used as passageways by small and medium-sized mammals, but not large mammals during the LSA study and other independent research projects. These are Collins Avenue, Equipment Passage, Alamos East Canyon, Simi Valley Landfill, and Santa Susana Pass Arch. Some enhancement proposals are discussed for these crossings. Some modifications to encourage the continued use of Collins Avenue, Simi Valley Landfill, and Santa Susana Arch by small and medium-sized mammals are provided in the following discussion.

Passageways that were used by large mammals (deer or mountain lion) were Alamos Canyon Road Underpass and Corriganville Tunnel. Passageways used by other target species (bobcat, coyote, etc.) were Collins Box Culvert, Equipment Passage, Alamos Canyon East Culvert, Hummingbird Creek Culvert, and Browns Canyon viaduct.

Highway structures which were not used by mountain lions but are large enough to accommodate lions are Hummingbird Creek and Alamos Canyon Road undercrossing. Even though mountain lion use of these passageways was not documented, the structure design is compatible. Shrubs and trees are required to provide cover for wildlife moving through this linkage in order for it to be functional. Alamos West Canyon would be suitable for large-sized mammal use by retrofitting of the existing culverts. More detail specifications are provided in the discussion below.

Large mammals were not detected using the structures at Rocky Peak Road, Movie Lane, Canoga Avenue, and Browns Canyon during the survey. The lack of use is likely due primarily to development or other landscape alteration such as roads and concrete channels. Nevertheless, modifications and enhancements are suggested for Rocky Peak Road and Canoga Avenue, since these structures connect dedicated open space and park lands on opposite sides of SR-118.

Iverson Road is not a functioning wildlife crossing because a private gated community blocks the north side of SR-118 at this underpass. There are no feasible enhancements possible to mitigate for the impediments to wildlife movement at this crossing location.

Structures that could function as large mammal passageways if enhanced are Collins Tunnel, Alamos West Canyon culverts, Simi Valley Landfill culvert, Rocky Peak Road overpass, Santa Susana Arch, and Canoga Avenue underpass. In general, enhancement suggestions include straightening the passageway, enlarging the passageway, installing wildlife fencing, restoring the native vegetation, providing signage for public awareness and education, removing human-related disturbances,

acquiring additional conservation easements, and removing accumulated sediments. The enhancement recommendations are discussed in detail for each crossing.

In addition to the crossings included in the SR-118 wildlife corridor assessment, other potential wildlife crossings or habitat linkages exist along the SR-118 in Simi Valley. Several 3-foot to 4-foot pipe culverts were not included as part of the study because the pipe diameters were too small for large-sized target species. These culverts were located at the west end of Simi Valley in between pockets of contiguous habitat from Arroyo Simi to the north side of SR-118, including the land between Los Angeles Avenue and SR-118. This area is adjacent to Oak Park and Alamos Canyon Road. Specific crossing enhancements are discussed in the following Alamos Canyon section. Table E provides a summary of all the enhancement proposals and cost estimates. The crossings and enhancement proposals are organized by regional habitat corridors which encompass the Caltrans wildlife crossings.

Although results of our study lead us to conclude that the highway structures at some of the study locations do not facilitate large mammal use, the surrounding undeveloped private and public lands are important for maintaining habitat connectivity parallel to SR-118. The undeveloped lands to the south and north of SR-118 are necessary to ensure continued use of the functioning regional wildlife corridors between Santa Susana Mountains and Simi Hills. The lands will also provide the required expansive areas of open space habitat required by dispersing mountain lions establishing their own home ranges.

Interconnected, large, and contiguous wildlife habitat areas are necessary to support viable populations of wildlife species that utilize the linkages and regional habitat corridors. If the land adjacent to SR-118 is developed in the future, the proposed project design should include habitat corridors, crossings, and passageways for large-sized wildlife species. Infrastructure (roads, storm drains, etc.) design should also include enlarging existing highway culverts that presently only accommodate small to medium-sized wildlife species.

The following is a summary of the minimum requirements for functioning passageways, crossings, and corridors for large-sized mammals. This information was collected as part of literature review required for this study (LSA, July 25, 2003). For more detailed discussion, refer the literature review report provided in Appendix C. A functioning wildlife corridor for large mammals must be at minimum of five miles wide. The passageway under a road must be at least 15 feet wide and either a bridge, box culvert, or arch with an earthen bottom. Also, there must be at least a 1,300-foot buffer area of native vegetation at the passageway location for the wildlife linkage to be suitable. Alternatively, a green bridge or ecoduct can be built to function as a passageway. The width of the green bridge is recommended to be over 650 feet wide (FHWA 2002).

4.1.1 Collins Tunnel

The Collins Crossing (Faulkner Canyon), located in the City of Moorpark, is at the western end of Simi Valley in Ventura County. This passageway as designed functions as a flood control structure joining an unnamed tributary north of SR-118 to the Arroyo Simi on the south. There are several enhancement proposals that could be applied to the Collins crossing to enhance the viability of the corridor for wildlife use. However, there are several obstacles that limit its usefulness as a medium to large-sized wildlife corridor.

Table E. – SR-118 Highway Structure Degree of Function as Large-Sized Mammal Wildlife Passageway

Passageway	Target Species Current Use of Passageway	Linkage Enhancements	Predicted Target Species Usage after Enhancements	Predicted Function of Crossing/Corridor Over Time	Cost Estimate by Enhancement	Highest Rate of Return
Tierra Rejada Valley Greenbelt to Big Mountain Corridor						
Collins Box Culvert	Bobcat	1. Relocate 1,000 ft of chain link fence 2. Plant trees and shrubs 3. Construct access ramps 4. Install culvert under rail road and Los Angeles Avenue	Mountain lion (potentially with installation of new passageway) Bobcat	Reduced – north canyon may be developed. Long-term viability with dedication of conservation easement north and south of SR-118	1. Low (<\$500,000) 2. Low 3. Moderate (\$500,000-2,000,000) 4. High (>\$2,000,000)	LOW
Equipment Passage	Coyote Bobcat	None Suggested	NA	NA	NA	NA
Alamos Canyon Corridor						
Oak Park Campground West Culverts	Bobcat (tracks inside culvert)	1. Wildlife fencing 2. SR-118 Box culvert 3. Los Angeles Ave Underpass 4. Conservation Easement 5. Plant trees and shrubs	Mountain Lion Mule Deer Coyote Bobcat	Threatened by development proposed along Los Angeles Avenue and north of SR-118. Long-term viability with dedication of conservation easement north and south of SR-118	1. Low 2. High (Tunnel Jack \$4,000/ft = \$2.4 million) 3. Moderate (\$800,000) 4. Moderate 5. Low (\$3,500)	MODERATE
Alamos West Canyon Culverts	None Observed Entering Culvert	Option 1. Rebuild into large underpass Option 2. North entrance modifications Option 3. Install a “catwalk”	Option 1: Mountain Lion, Mule Deer Option 2: Coyote, Bobcat, possibly Mountain Lion Option 3: Possibly Coyote, Bobcat	Threatened by development proposed along Los Angeles Avenue and north of SR-118. Long-term viability with dedication of conservation easement north and south of SR-118	1. High 2. Moderate 3. Low	MODERATE

Table E. – SR-118 Highway Structure Degree of Function as Large-Sized Mammal Wildlife Passageway

Passageway	Target Species Current Use of Passageway	Linkage Enhancements	Predicted Target Species Usage after Enhancements	Predicted Function of Crossing/Corridor Over Time	Cost Estimate by Enhancement	Highest Rate of Return
Alamos Canyon Road Underpass	Mule Deer Coyote Bobcat	1. Plant trees and shrubs 2. Rip road and remove fence 3. Block road access and have periodic police sweeps for transient camps 4. Enlarge culverts at railroad and Los Angeles Avenue	Mountain lion Mule Deer Coyote Bobcat	Reduced if development occurs along Los Angeles Avenue and north of SR-118. Long-term viability with dedication of conservation easement north and south of SR-118	1. Low 2.Low 3.Low 4. High	MODERATE
Alamos East Canyon Culvert	Bobcat (tracks inside culvert)	1. Plant native vegetation to restore areas 2. Enlarge culvert	With Measure 2 Mountain lion , Mule Deer (possible) Coyote Bobcat	Reduced if development occurs along Los Angeles Avenue and north of SR-118. Long-term viability with dedication of conservation easement north and south of SR-118	1. Low 2. High	MODERATE
Simi Valley Landfill Culvert	None Observed Entering Culvert	1.Plant native vegetation to restore areas 2. Enlarge culvert	With Measure 2 Mountain lion, Mule Deer (possible) Coyote Bobcat	Reduced if development occurs along north side of Los Angeles Avenue. Long-term viability with dedication of conservation easement south of SR-118	1. Low 2. High	LOW
Santa Susana Pass Corridor						
Hummingbird Creek Culvert	Coyote Bobcat	1. Relocate fence south of SR-118 2. Habitat Restoration	Mountain lion (possible) Coyote Bobcat	Viable for long-term since surrounding land is protected open space or already built out.	1. Low 2. Low	LOW

Table E. – SR-118 Highway Structure Degree of Function as Large-Sized Mammal Wildlife Passageway

Passageway	Target Species Current Use of Passageway	Linkage Enhancements	Predicted Target Species Usage after Enhancements	Predicted Function of Crossing/Corridor Over Time	Cost Estimate by Enhancement	Highest Rate of Return
Corriganville Tunnel	Mountain Lion Mule Deer Coyote Bobcat	1. SR-118 Green bridge 2. Close Wildlife Corridor Trail 3. Security fence 4. Habitat restoration	Mountain Lion Mule Deer Coyote Bobcat	Viable for long-term since surrounding land is protected open space	1. High 2. Low 3. Low 4. Low	HIGH
Rocky Peak Road Overpass	None Observed	1-1. No project-Land Bridge 1-2. No project-park access road 2. Build-out	1-1. mule deer, coyote, bobcat, possibly mountain lion 1-2. mule deer, coyote, bobcat 2. coyote, possibly	1. Viable for long term since surrounding land is protected open space. 2. Not viable.	1.1 Moderate 1.2 Low 2. N/A	MODERATE
Santa Susana Arch	None Observed Entering Culvert	1.Plant native vegetation to restore areas 2. Enlarge culvert	With Measure 2 Mountain lion, Mule Deer (possible) Coyote Bobcat	Long-term viability since it is located between park lands or other dedicated open space. Although, Caltrans culvert modifications can eliminate use of this passageway.	1. Low 2. High	MODERATE
Santa Susana Park to Oat Mountain Corridor						
Canoga Avenue Underpass	None observed in underpass	1. Trail improvements 2. Fence relocation 3. Wildlife Cover	Coyote Bobcat	Long-term viability since it is located between parks or other dedicated open space.	1. Low 2. Low 3. Low	MODERATE
Browns Canyon Viaduct	Coyote Bobcat	1. Police sweeps for encampments	Coyote Bobcat	Viable for long-term since surrounding land is protected open space. Additional protection of riparian and upland habitat in Browns Canyon would be beneficial.	1. Low	LOW

Detriments to Wildlife Usage as Currently Designed. The limitations to large-sized wildlife use at this crossing include the following:

- Difficulty in accessing the passageway because of the steepness and finished surface associated with the reinforced concrete trapezoidal channel extending several hundred feet on both north and south sides of the Collins tunnel.
- A six-foot tall vertical drop structure located approximately 300 feet upstream of the undercrossing.
- The midway turn in the tunnel which obstructs the view of the opposite opening.
- Enclosure of the crossing by chain link fencing on both banks of the channel.
- Human disturbance within the channel and tunnel entrance.
- The close proximity of single-family housing northwest of the crossing and a large mobile home community to the southeast.
- The immediacy of Los Angeles Avenue and the railroad tracks to this crossing.

Recommended Enhancement Proposals. With the recommended enhancement proposals incorporated, the Collins crossing may provide a potential linkage to the extensive open space on both sides of the freeway for medium-sized and possibly large-sized wildlife mammals.

Proposal 1. First, we propose that wildlife access to the Collins Crossing be improved by providing wildlife access ramps either at the vertical drop structure at the north end of the concrete-lined trapezoidal channel, or preferably along the east bank of the concrete channel as close to the tunnel as practicable (Figure A3). Wildlife prefers to walk on natural substrate; therefore, it is recommended that the concrete bottom be amended with the placement of an earthen bottom.

Proposal 2. As currently configured, the chain link fencing surrounding the concrete channel improvements on both banks of the channel is an impediment to wildlife movement. This fencing should be removed or redesigned to allow for the passage of wildlife across the train tracks to Arroyo Simi.

Proposal 3. A wildlife underpass is needed extending to the Arroyo Simi Wash, and sized to allow for use by medium and large mammals in order to improve access to the habitat areas. The new tunnel would be placed at an approximate right angle to the existing concrete channel on the south side of the SR-118 as close to the tunnel as feasible.

Proposal 4. Vegetation should be enhanced along the access points at both ends of the passageway to provide more adequate cover for wildlife movement and to discourage unauthorized human use. Signage would be posted at both ends of the passageway educating local residents about the local flora and fauna, the danger of large carnivores in the local area, and the importance of the Collins crossing to large mammals seeking connectivity between the Santa Susana Mountains and the Simi Hills west of the City of Simi Valley.

4.1.2 Oak Park Campground

Other pipe culverts (36- to 48-inch diameter) under SR-118 between Collins Drive and Alamos Canyon Drive could also provide linkages for wildlife. One or more of these culverts could be enlarged to accommodate deer and mountain lion movement from Arroyo Simi to Big Mountain (Figure A4).

Recommended Enhancement Proposals. The enhancement proposals listed below would be used in combination to direct wildlife through the open space between SR-118 and Los Angeles Avenue. Wildlife movement would be facilitated by large mammal passageways under the railroad tracks and Los Angeles Avenue located west of Oak Park Campground (Figure A4).

Proposal 1. Deer-proof or wildlife fencing with one-way gates or earthen ramps would surround the open space areas, as necessary to direct wildlife to the passageways. The fence would be installed around the perimeter of Oak Park Campground and around the mobile home park south of SR-118. Currently, the campground boundary is up to the highway right-of-way. Possibly, campground activities could move 500 feet to the south and the fence be relocated, so that the north end of Oak Park would be set aside to allow medium- and large-sized mammals to use this area as a corridor between Oak Park and SR-118.

The wildlife fencing would funnel wildlife to a small drainage approximately 1,000 feet to the west of Oak Park (Figure A4, tunnel #5). At this location, an undercrossing (preferably 100 feet wide with a soft substrate bottom) would pass beneath both the railroad tracks and Los Angeles Avenue. The drainage adjacent to the undercrossing would be vegetated with riparian species that would provide desirable cover for wildlife use. The wildlife fence would continue around development until the wildlife is directed to the Arroyo Simi open space.

Proposal 2. One or more of the existing culverts should be replaced with more suitable wildlife passageway structures. Trenchless culvert replacement or “tunnel jacking” technology could be used to install a 10-foot by 10-foot or larger box culvert in a location west of Oak Park (Figure A4, tunnels #6 and #7).

Proposal 3. The acquisition of a wildlife corridor/conservation easement in the vicinity of the existing concrete plant and mobile home park would provide wildlife with a more suitable area to travel through south of Los Angeles Avenue to enter Arroyo Simi.

Proposal 4. The land between SR-118 and Los Angeles Avenue is grassland and scattered coastal sage scrub. Oak, cottonwood, willow, and or sycamore trees along with large native shrubs such as laurel sumac should be planted to provide cover for wildlife movements.

4.1.3 Alamos Canyon West

The potential wildlife crossing at Alamos Canyon West consists of a 10-foot diameter double RCP culvert that runs for 816 feet under SR-118 and is located within a drainage that conveys flow to Arroyo Simi. During the course of the study, data provided by 35mm camera setups, scent stations, and general observations by field biologists indicate that a variety of medium to large mammals can be found in the general vicinity north and south of SR-118 at Alamos Canyon West. Although some

photographs of wildlife were captured by the 35mm setups at the culvert entrance, no photographs conclusively showed that the wildlife entered the culvert or was observed on both north and south sides of SR-118 at times that indicate the animal traversed the length of the culvert.

Currently, the Alamos Canyon West culvert does not appear to function as an effective passageway for wildlife to travel between the quality habitat that can be found both north and south of SR-118. We suggest that the following enhancement proposals be applied to this location in an attempt to facilitate movement by wildlife along this drainage under SR-118.

Currently, the largest obstacle to wildlife movement in the area of Alamos Canyon West is the culvert structure itself. Approaching the culvert from the north side of SR-118, the culvert drops at approximately a 45 degree angle at the north entrances. Along with the steep path that would have to be taken by wildlife, the culvert has often been observed to have running water and large amounts of debris which collects on the southern side of the SR-118. The slope of the culvert compounded with water and sediment may be factors which reduce wildlife traffic. Standing at the entrance to the culvert on either the north or south side of SR-118, and looking into the culvert, the other side cannot be seen because of the drop in grade at the north end of SR-118.

Recommended Enhancement Proposals. The following enhancement suggestions are options to improve the Alamos Canyon West culverts. These improvements should facilitate north-south movement along this drainage and – paired with the improvements suggested for Oak Park, the Alamos Canyon Road Underpass and Alamos Canyon East culvert – would help to establish a corridor for wildlife along this western section of SR-118 needed for large-sized wildlife movement. Within the SR-118 study area, the Alamos Canyon Linkage is the next best viable wildlife corridor between the Simi Valley Hills and the Santa Susana Mountains. The most viable is the Santa Susana Pass Linkage.

Proposal 1: Passageway Structural Improvements, Option 1. We recommend that the twin culverts be combined into one enlarged into a bridge structure under SR-118. A bridge or undercrossing would be more suitability sized to accommodate large and medium-sized mammals. The design should be altered to decrease the angle of the drop off at the north end of the culverts, thus giving wildlife an easier path to travel in addition to providing a line of sight to the other side of the undercrossing.

Proposal 1: Passageway Structural Improvements, Option 2. An alternative recommendation is to reduce the pitch of the north culvert entrances by regrading the approach and lowering the entrances. In this case, the twin culverts would not be combined.

Proposal 1: Passageway Structural Improvements, Option 3. A raised solid 5-foot wide “catwalk” could be attached to the inside wall and run the entire length of one or both of the culverts as a means of reducing the slope at the entrance of the culvert. This catwalk design is typically installed in perennial stream culverts.

4.1.4 Alamos Canyon Road

Unlike the majority of crossings focused on during this study, the Alamos Canyon Road undercrossing appears to be a relatively well designed crossing for use by a variety of wildlife.

Alamos Canyon Road Underpass provides a relatively short traverse which allows wildlife to see the other side and there are gaps in the bridge structure that allow a significant amount of natural light to penetrate the passageway. This allows for the establishment of native vegetation underneath SR-118. The topography is nearly flat, with a two-lane asphalt road that crosses the middle of the passageway.

Recommended Enhancement Proposals. Coyote were observed using the underpass via the 35mm camera setups during the year-long study. It can be inferred that other types of medium and large wildlife would also use this area to travel between habitat located on the north and south sides of SR-118. Considering this corridor's proximity to the Alamos Canyon West Culvert, it is likely that, with improvements to both areas, a viable corridor could be created linking the Santa Susana Mountains to the north and the Simi Hills to the south.

Proposal 1. A mitigation measure that would enhance the Alamos Canyon Road undercrossing consists of increasing the amount of cover for wildlife by planting trees and shrubs along Alamos Canyon Road. These areas consist primarily of ruderal grassland with scattered scrub species; however, there are several areas where there is bare ground. Increasing the vegetative cover along Alamos Canyon Road should help to encourage more reclusive species to utilize the underpass.

Proposal 2. The paved road could also be ripped and the surface changed to decomposed granite surface, since wildlife avoid paved surfaces (Figure A4). The barbed wire fence along Alamos Canyon Road should be removed from both sides of SR-118 to allow for unrestricted wildlife movement.

Proposal 3. Another factor which may deter wildlife from using the Alamos Canyon Road undercrossing is the amount of human traffic in the area. It is clear that the area surrounding the Alamos Canyon Road undercrossing is utilized as an illegal dumping site and several active homeless camps were observed during the year-long study. To help reduce the amount of traffic on Alamos Canyon Road and subsequently the surrounding areas, we suggest that a gate be installed near the road's intersection with the railroad tracks. This should help in preventing further illegal dumping and reduce the overall human traffic. In addition, efforts should be made to remove all homeless camps. The areas that contain homeless camps are especially problematic in that they represent consistent human impact on the local habitat, and over time wildlife may avoid these locations altogether.

Proposal 4. In considering the habitat suitability on a larger scale, the area north of SR-118 consists of high quality habitat within the Santa Susana Mountains, while south of SR-118 there is equally suitable habitat within the Simi Hills. However, south of SR-118, wildlife would be required to traverse train tracks, Los Angeles Avenue, and several areas of development to access the Simi Hills. Currently, there is railroad bridge and a small culvert under Los Angeles Avenue. To mitigate for these barriers to wildlife movement, we suggest constructing larger undercrossings at the railroad crossing and at Los Angeles Avenue and securing a conservation easement along Alamos West Canyon Creek to Arroyo Simi (Figure A4, tunnels #3 and #4). An earthen-bottomed 15-foot culvert (at a minimum) with at least a 500-foot wide habitat buffer is recommended.

4.1.5 Alamos Canyon East

The culvert passageway located at Alamos Canyon East consists of a 6-foot diameter RCP culvert, extending approximately 600 feet under SR-118. Data collected from scent stations and general observations by field biologists indicate that a variety of medium-sized to large mammals can be found in the general vicinity north and south of SR-118 at the Alamos Canyon East culvert. However, there were no indications that the wildlife in the area was utilizing the culvert to travel between north and south sides of SR-118. RCP culverts like that found at Alamos Canyon East are not typically utilized by most wildlife of concern in this study. Both size constraint and overall length are factors which may deter both medium-sized and large mammals from traversing the RCP culvert.

Recommended Enhancement Proposals. Considering the wildlife that was observed in the area and that this culvert is located in a drainage, we believe that, if the Alamos Canyon East culvert was enhanced by mitigation measures, it may potentially be utilized by wildlife as a crossing from one side of SR-118 to the other. This would allow for an increased access to habitat needed for life-sustaining activities.

Proposal 1. Mitigation measures that would enhance the Alamos Canyon East culvert consist of increasing the amount of cover for wildlife by planting native vegetation in the areas along the drainage. This location currently consists of sparse areas of scrub and large areas of bare ground following the 2003 wildfires. An increase in the vegetative cover throughout this area should help to encourage more reclusive species to utilize the Alamos Canyon East culvert.

Proposal 2. This culvert could be enlarged by “tunnel jacking” during the future replacement or repair project. Tunnel jacking is a trenchless method used to bury or replace pipelines and culverts (NRCC 2002). Ideal dimensions would be at least 8-foot by 8-foot concrete box culvert or arch. Design allowances for some sediment accumulation in the culvert, in order to form an earthen bottom, would encourage wildlife usage. Increasing the size of the culvert should alleviate any issues of size constraint and may enhance visibility from one side of the corridor to the other. These enhancements should help to facilitate use of the culvert by both medium-sized and large mammals.

In conjunction with the enhancement proposals at Oak Park, Alamos Canyon West, and Alamos Canyon Road addressed in above sections, these proposals should help to enhance this potential East Canyon crossing. These enhancement proposals include installing wildlife fencing, reducing the amount of human disturbance, and addressing barricades to wildlife movement south of SR-118. The reduction of human disturbance in the area may be achieved by installing a gate at Alamos Canyon Road, removing homeless encampments, and routine patrols by relevant officials (police and Caltrans). The issue of homeless encampments is especially relevant to the Alamos Canyon East culvert crossing considering there has been large area impacted by an encampment and associated dumping activities near the culvert entrance on the south side of SR-118. Additionally, the functionality of the crossings for wildlife with larger home ranges (i.e., mountain lion) could be improved by addressing the other barriers to wildlife movement south of SR-118: the railroad tracks, Los Angeles Avenue, and the areas of development.

4.1.6 Simi Valley Landfill and Santa Susana Arch

The passageways located at the Santa Susana Arch and the Simi Valley Landfill are structurally alike and, therefore, have similar issues to consider regarding their use as corridors by wildlife. The Santa Susana Arch passageway consists of a 6-foot diameter concrete pipe culvert with a flat bottom. The culvert extends for approximately 500 feet under SR-118, linking the Santa Susana Historical Park to the north with the Joughi Open Space to the south. The Simi Valley Landfill passageway consists of a 6-foot diameter corrugated metal culvert that extends for approximately 588 feet under SR-118.

Recommended Enhancement Proposals. Both passageways offer the similar size restrictions and are considerably longer than structures typically used by target wildlife as corridors. Throughout the study, a variety of wildlife was determined to be in the area of both passageways, and it is apparent that some medium-sized wildlife species, such as raccoons, do use the passageways.

Most of the target species would not likely use passageways that are both as size-restrictive and as long as the Santa Susana and Simi Landfill culverts. These culverts could potentially be enhanced by a variety of means, including the use of “tunnel jacking” to increase the overall width of the passageway. Tunnel jacking is a trenchless method used to bury or replace pipelines and culverts (NRCC 2002).

Proposal 1. The culvert could be enlarged to more suitable dimensions of least 8-foot by 8-foot concrete box culvert or arch. Design allowances for some sediment accumulation in the culvert, in order to form an earthen bottom, would encourage wildlife usage. Increasing the size of the culvert should alleviate any issues of size constraint and may enhance visibility from one side of the corridor to the other. These enhancements should help to facilitate use of the culvert by both medium-sized and large mammals.

Proposal 2. The viability of the crossings at these locations could also be improved by planting trees and shrubs in areas around the culvert entrances that are lacking in sufficient plant cover.

4.1.7 Hummingbird Creek

The Hummingbird Creek culvert could be used to skirt around the development and enter the west side of Corriganville Park. The culvert is large enough for deer and mountain lion and is known to be used by coyote and bobcat.

Recommended Enhancement Proposals. The following enhancement suggestions are options to improve the Hummingbird Creek culvert.

Proposal 1. The highway fence could be relocated to allow animals to reach Corriganville Park from the west.

The White Oak Park and Hummingbird Creek Trail areas are an important contribution to the open space areas located north of and parallel to SR-118, since they are contiguous with Corriganville and Rocky Peak Parks to the east.

Proposal 2. The White Oak Park and Hummingbird Creek area has the capacity to be enhanced through the restoration of natural vegetation in the creek, along the trails, and areas disturbed by road construction.

Proposal 3. Any highway infrastructure or storm drain improvement at Hummingbird Creek needs to accommodate large and medium-sized wildlife movement in the culvert. Native vegetation must be allowed to persist along the creek and in the highway right-of-way to provide wildlife habitat and cover.

4.1.8 Corriganville Park Equestrian Tunnel

The Corriganville Park Equestrian Tunnel (CPET) provides access to both sides of SR-118 for hikers, bicyclists, equestrians, and wildlife. The CPET is part of the least-cost wildlife corridor between the Simi Valley Hills and the Santa Susana Mountains (South Coast Wildlands Project 2004). Although the CPET allows for the greatest connectivity between undeveloped open space to the north and south of SR-118, there are several enhancement proposals that could be applied to the CPET that could further enhance the viability of this corridor.

Recommended Enhancement Proposals. The current and future impact to wildlife use at this crossing could be increased human disturbance. Pedestrians utilize the tunnel during the day for hiking and other recreational use, and also at night to vandalize and spray paint the tunnel walls. The function of the CPET could be enhanced by restricting human activities near the tunnel, especially from dusk to dawn. Passageways could be built or converted for wildlife use only.

Proposal 1. A vegetated wildlife overpass at Corriganville Park crossing over SR-118, such as a green bridge or ecoduct, could be built to span between the knolls located east of the wildlife tunnel (Figure A5). There are hills on either side of SR-118 that could be used as footings for the bridge. The topography change is not abrupt in this location and the ecoduct would appear as a ridge across SR-118.

Research shows that large mammals prefer green bridges to other types of crossing structures (Forman and others 2003). According to the South Coast Wildlands Project (2003), there are currently 50 of these overpasses in use throughout Europe and North America. Green bridge width is recommended to be at least 200 meters (656 feet) (Foreman and others 2003). The green bridge should have soil at least six feet deep for growing herbaceous plants, shrubs and trees. Vegetated overpasses maintain ambient conditions of rainfall, temperature, light, and cover, and are quieter than underpasses (Jackson and Griffin 1998).

Proposal 2. The existing trail that leads up to the CPET could be closed and revegetated. The trail from Rocky Peak would also be closed and restored to native vegetation. Stage Coach Trail which parallels Santa Susana Road would be relocated farther down slope. The trail would then originate from the end of the parking area lot (Figure A5).

Proposal 3. We propose that a locking security fence (not a fire road gate) be installed at the parking lot entrance to Corriganville Park and at Foothill Park. This may have already been part of the park improvements done by the Rancho Recreation and Park District. The security fence would be locked at night and would encompass all access points into the park from the

parking lot, making it extremely difficult to gain access to the trails leading up to the CPET except during the day. The fence would encompass the parking lot, but not the trails and campgrounds, so that wildlife movement through the area would not be blocked.

Proposal 4. Due to the wildfires, native vegetation should be seeded or planted at both ends of the CPET to provide more adequate cover for wildlife movement. Due to the fact that the CPET is already highly used by wildlife, all enhancements (i.e., revegetation and installing fencing) to this corridor would be accomplished using techniques that would keep the disturbance to the native landscape at a minimum. Existing trails would be used for the movement of materials and equipment and expanded on only in areas where it was absolutely necessary.

4.1.9 Rocky Peak Road Overcrossing

This wildlife corridor assessment study was promulgated by the planned, and already approved, highway improvement project at this interchange. The eastbound off-ramp and the westbound on-ramp at Rocky Peak Road have not been completed. Currently, the earthen fill is in place, but the infrastructure – pavement, curb, signage and guard rail – are not yet built. Increasing the vehicle traffic at this location will have direct and indirect effects upon the adjacent wildlands. Enhancement proposals are provided for this passageway to minimize the impacts to wildlife movement.

Proposal 1 with No-Project. As an alternative, on-off ramps are suggested to be constructed at Iverson Road or Movie Lane instead of at Rocky Peak Road to meet project goals and purpose of providing an addition interchange for emergency vehicles turn-around and to accommodate current and future traffic demands. This action would be similar to closing the Coal Canyon Road ramps on SR-91 for mountain lion movement between Cleveland National Forest and Chino Hills State Park.

Option 1. Considering Rocky Peak Road independently of other wildlife crossings along SR-118, Rocky Peak Road is an important wildlife passageway. Rocky Peak Road overcrossing is located between two large tracts of open space and recreational areas. The only purpose of this bridge is to access to Rocky Peak Park. This bridge could be converted to a vegetated land bridge by closing the existing ramps, backfilling with soil and planting native shrubs, and installing a fence to shield the crossing from freeway below. One lane could be converted to a gravel bed road for emergency vehicle access.

Option 2. Another option is to eliminate vehicle access to Rocky Peak Road from SR-118, but allow vehicle access from Santa Susana Pass Road. Recreationists can still park in the north parking area via Rocky Peak Road overcrossing. Fencing should be placed on the overpass to block view of traffic below. Resurfacing the road by placing a layer of decomposed granite would improve the likelihood of wildlife use.

Proposal 2 with Build-out at Rocky Peak Road. Wildlife impacts will occur from the increased noise, lighting, trash, traffic volumes, and human accessibility to the parks and trails. Minimally, if the Rocky Peak Road ramps are built, then street and sign lighting should not be installed. Right-of-way fencing should be installed in a manner so as not to block movement through the hillsides and drainages between Santa Susana Pass Road and Rocky Peak Road interchange.

4.1.10 Canoga Avenue

There are several enhancement proposals that could be applied to the Canoga Avenue underpass and thus enhance the viability of the crossing. Currently, automobile traffic utilizes the paved portion of Canoga Avenue to enter and exit the residential community north of SR-118. The unpaved area, or shoulder, accounts for approximately 75 percent of the area underneath SR-118 and is utilized mostly for vehicle parking and unloading of refuse during illegal dumping. The chain link fence located on both the eastern and western sides of the underpass restricts wildlife movement through the corridor to Canoga Avenue and the adjacent shoulder.

Recommended Enhancement Proposals. The following enhancement suggestions are options to improve the Canoga Avenue underpass.

Proposal 1. We propose to improve the trail system in the Canoga Avenue underpass (Figure A6). The equestrian trails would be separated from the road and join the Devil's Canyon and Stoney Point Park equestrian/hiking trails. The trails do not currently have a distinct linkage and end at the Canoga Avenue pavement on the north and south sides of SR-118. This new trail linkage would involve using the unpaved shoulder area that was formerly utilized for loitering and illegal dumping. This area would now be off-limits to vehicles and could be improved into a hiking/equestrian/wildlife trail running along the west and east sides of the Canoga Avenue (Figures A7a and A7b).

Proposal 2. Wildlife could be encouraged to use the new trail area by removing or relocating of the current chain link fence configuration and replacing it with appropriate equestrian fencing at the terminus of the equestrian trail north of SR-118. The current chain link fencing along the western side of Canoga Avenue would be relocated to farther west, thereby including the unpaved shoulder as a portion of the area for the proposed trail linkage. The same would be done on the east side of the underpass. The existing equestrian fence on the east side of Canoga Avenue would be extended to connect with the trail gate north of SR-118.

Proposal 3. The placement of large rock structures and vegetation along the trail fence would provide some cover for more reclusive wildlife. This can be accomplished with little impact to local residents who utilize the area only for entering and exiting the residential community.

A secondary benefit to this enhancement proposal of reducing the road shoulder in the Canoga Avenue underpass for vehicles should cut down on loiterers and illegal dumping. On several occasions during the course of the study, local residents voiced concern regarding the illegal dumping, loitering, and other activities that occur at the underpass. It appears other organizations have been struggling with a solution to the illegal dumping issue. A representative of the Valley Horse Owners Association (VHOA) met with the City of Los Angeles North Valley Area Director to discuss illegal dumping at Canoga Avenue and preserving the equestrian trail system in the North Valley (VHOA 2002). The improvements we suggest above may offer a resolution to the problems of trespassers and dumping at Canoga Avenue and create an improved wildlife crossing and equestrian trail.

4.2 ESTIMATED COST OF ENHANCEMENT PROPOSALS

The estimated costs of the enhancement proposals were derived from cost sheets from past Caltrans projects, using rough estimates by Caltrans District 7 hydrologists and structural engineers, from cost estimates from related LSA projects and other literature sources. Detailed or precise cost estimates for most of the enhancement proposals could not be calculated since the proposals are conceptual recommendations. Based on rough numbers provided by the project team, the enhancement proposal costs were lumped into broad price ranges. Cost estimates were categorized as “Low” for less than \$500,000, “Moderate” is \$500,000 to \$2,000,000, and “High” is over \$2,000,000.

Low or minimal costs were associated with fence relocation and restoration. Moderate costs were for some structural changes to passageways and crossing areas. High costs were associated with culvert retrofits (tunnel jacking), undercrossing installations, and green bridge construction. Previously referenced Table E lists the cost estimates for each enhancement proposal.

4.3 CUMULATIVE EFFECTS – IMPACTS TO ENHANCEMENT RECOMMENDATIONS AND FUTURE CORRIDOR VIABILITY

The study area extends approximately 15 miles along SR-118, from the City of Moorpark in Ventura County on the west to the community of Chatsworth in the City of Los Angeles on the east. The majority of the study area is densely urbanized, with the City of Simi Valley bisecting the Santa Susana Mountains from the Simi Hills. Due to the extensive urbanization, opportunities for wildlife movement between the Santa Susana Mountains and the Simi Hills is restricted to the Collins/Alamos Canyon linkage to the west between the Cities of Simi Valley and Moorpark, and Corriganville/Rocky Peak linkage to the east between the City of Simi Valley and Los Angeles.

Existing urbanization will be the greatest obstacle to overcome in designing and implementing future wildlife crossings through the SR-118. Where possible, limiting and redirecting future development will be required if providing viable and sustainable wildlife linkage to the open lands to the south and north of the SR-118 is to be realized. Additionally, consideration to wildlife corridors should be considered in the larger landscape context, such as described by the SCWP specific wildlife corridor studies (2000, 2003, and 2004).

4.3.1 Private Land Development

City Projects. The majority of the remaining undeveloped parcels within the city limits of Moorpark and Simi Valley have development plans submitted to the respective planning departments, environmental documents in review, or the development projects already under construction.

In the foothills and agricultural land in the northwest City limits of Moorpark, 1,807 acres are either under construction or approved for construction. Projects include single-family housing, multifamily units, a country club, equestrian trails, and 27-hole golf course between Happy Camp Canyon, Championship Drive, Grimes Canyon Road, and Poindexter Avenue. These projects are within the City limits of Moorpark and the City Urban Restriction Boundary (CURB) limits (Figure B2).

Tract housing is being completed in Long Canyon Village east of Bard Reservoir. This 1,813-acre specific plan developed the land south of Madera Road. Several projects are completing the final phases of the specific plans. Completion of Runkle Ranch and Parker Ranch tracts located south of the city are under construction. Approximately 900 acres will be developed. Parker Ranch also includes 164 acres of open space. A 550-acre residential project proposal had been submitted to the City. This project would involve rezoning recreational and open space north of Montgomery Fire Road, which is north of Challenger Park.

An application was submitted to the City of Simi Valley in order to amend the General Plan for projects south of Los Angeles Avenue and north of Tierra Rejada Road. The project area is located south of Los Angeles Avenue, 4,000 feet west of water treatment plant and continues to the north side of Tierra Rejada Road near Oak Park campground. The projects require rezoning of Open Space/Light Industrial to Open Space/Residential Moderate Density. Approximately, 260 acres will be developed into senior housing and an 18-hole city golf course.

The 1,009-acre Big Sky Ranch subdivision north of SR-118 at the terminus of Erringer Road has been approved through amendments to the City of Simi Valley General Plan. The Rancho Simi Open Space Conservation Agency is not currently developing Corriganville Park even though it is a City-approved project. Due to lack of funding, only remedial improvements, such as clean up, parking lot blading, temporary restrooms and maintenance shed added, and gate installation have been completed. An applicant has requested a zoning change to build an equestrian center, 15-foot tall buildings, and a helicopter pad on a 96-acre parcel on north Kuehner Drive (Hummingbird Ranch). Marr Ranch, a 226-acre residential project located at the northern terminus of Yosemite Avenue, is currently under construction.

Industrial and commercial development projects have been approved or proposed for land adjacent to SR-118 and Los Angeles Avenue. An applicant has proposed to build commercial buildings west of Cochran Avenue and south of SR-118 in the City of Simi Valley. A shopping mall specific plan has been adopted for 129 acres north of SR-118 between First and Erringer Road.

Commercial centers and industrial buildings are either completed or approved along Arroyo Simi on both sides of SR-118 on 60 acres between East Los Angeles Avenue and New Los Angeles Avenue in Moorpark.

City Annexations of Unincorporated County Land. Future land development is expected to occur in the unincorporated areas of Ventura and Los Angeles Counties, since the majority of the land within current city limits has been built out or will be built out within the next 10 years (Solimar Research Group 2002). The grazing and agricultural areas in the valleys between and on the foothills the Santa Susana Mountains and the Simi Hills are considered developable areas for housing (SCAG 2002). Residential housing tracts are proposed up to two miles into the hills north and south of SR-118 in the Simi Valley region.

A 3,544-acre specific plan (North Park Village) is currently being processed by the City of Moorpark. This project is for single- and multiple-family housing in the undeveloped area northeast and outside of the existing CURB limits. This project must be placed on the ballot for voter approval before construction can begin.

Currently in review by the City of Simi Valley is The Canyons, a 2,880-acre residential and commercial development specific plan which extends from the eastern City limits of Moorpark to Madera Road and 2.25 miles north of SR-118. This project is likely to be subject to the Save Open Space and Agricultural Resources (SOAR) initiatives or to require General Plan amendments for project approval.

Save Open Space (SOS), a conservation group, is currently lobbying to halt this proposed development project (North Park Village) and "The Canyons" specific plan (SOS 2004). This group facilitates the establishment of permanent parklands in Simi Hills. Examples of development projects ultimately dedicated as open space through SOS were Ahmanson Ranch and Jordon Ranch.

Green Park Holdings has proposed to the City of Simi Valley to amend the General Plan in order to develop a residential community on 1,600 acres located at the southern terminus of Sequoia Avenue/Runkle Haul Road. The southern half of the Green Park Specific Plan would be designated as open space as currently proposed.

County Projects. The Egg City subdivision project proposed to construct estate lots on 286 acres. The project is located west of Grimes Canyon Road, north of Shekell Road, and northwest of the City of Moorpark. Other subdivision plans submitted to the County are not within the study area boundary. Development within the County of Ventura is practically non-existent with the exception of development within existing communities (personal communication with County of Ventura Senior Planner, Dennis Hawkins, March 25, 2004). The County General Plan is currently being revised. Development can occur within communities such as Egg City, Piru, Santa Susana, and Somis. If any new housing projects were to be proposed in the County and are located outside of any City CURB limits, a ballot measure would be required in order to incorporate the lands to City jurisdiction. SOAR ballot measures are also required to obtain voter approval for any new subdivisions in the County of Ventura.

4.3.2 Public Projects

Proposed or anticipated public projects include transportation projects, construction of potable water and sewer facilities, public schools, public parks, or other government facilities.

Caltrans transportation projects include the following:

- Rocky Peak Road – approved ramp completion project;
- Moorpark College interchange (Madera and Easy Street);
- Ventura 118 widening from Tapo Canyon to Los Angeles County;
- Ventura 118 traffic signal interconnection for City of Moorpark;
- Ventura 23 widening;
- New Los Angeles Avenue Widening (4 to 6 lanes) from Spring Street to SR-23 and from SR-23 to Tapo Canyon Road;
- Alamos Canyon Underpass opening;

- Alamos Canyon interchange ramps;
- Tampa Avenue widening and off-ramp construction;
- Madera Road/Easy Street interchange for Moorpark College;
- Keuhner Avenue/Hummingbird Creek debris rack;
- Normal transportation maintenance activities; and
- Los Angeles Avenue/Tapo Canyon Street Intersection Widening (Caltrans 2003).

Road, culvert, and structural maintenance work will be done by Caltrans as needed within the study area; most work is associated with wildfire and flood damage. Recently completed maintenance tasks include the following:

- Santa Susana Arch arroyo – boulder/debris rack upstream of culvert; and
- Alamos Canyon west culverts – removal of sediments from south end of box culverts and eradication of an estimated 200 feet of riparian woodland.

The Calleguas Regional Salinity Management Project is currently under construction (Calleguas Municipal Water District 2001). The project involves installing a brine discharge pipeline system from Simi Valley to the Pacific Ocean at Oxnard. The Moorpark and Simi Valley phase of construction is planned to start in 2006. The County of Ventura has approved the expansion of the Simi Valley Landfill in order to extend site life for another 30 years.

4.3.3 Save Open-Space and Agricultural Resources (SOAR)

The Save Open-space and Agricultural Resources (SOAR) organization of Ventura County proposes, through bond measures, initiatives to limit urban sprawl and to promote agricultural, natural resources, and open space land uses. The following text is an excerpt of the history of SOAR from the organization's web site.

The original Napa Valley, California Initiative passed in 1990 was used as a template for the city of Ventura SOAR (passed by voters in 1995), the City of Thousand Oaks measure (adopted in 1996), and the Ventura County SOAR (approved in 1998).

The SOAR measure is a General Plan Amendment. California law allows for lawmaking by initiative, including the amendment of city and county General Plans. The SOAR measure prevents changes in specified land use categories of the General Plan unless the land use change is approved by a (simple) majority of voters. In other words it locks in certain land use categories and puts the keys in the hands of the voters.

The requirement of a vote of the people provides greater protection to those valuable resources the measure specifies. For example, the County of Ventura SOAR protects three land use categories: Open space, Agriculture and Rural Land. Parkland is protected by the Thousand Oaks measure.

A second type of SOAR Initiative, called CURB, was devised to further fortify SOAR protected lands. CURB, a companion initiative to the county SOAR, applies to cities. The CURB is an urban boundary line that is drawn around a city and a vote of the people is required before a city can urbanize land outside the CURB line. This double protection precludes instances where a city may annex from the county lands protected by SOAR and develop them without a vote of the people. Sprawling cities often expand outward by annexing more land into their boundaries for urbanization. CURB is an acronym that stands for City Urban Restriction Boundary (SOAR 2002).

CURB initiatives are in place for the Cities of Moorpark, Simi Valley, and Thousand Oaks. Under current policies, Ventura County will run out of residential land in 2020 and in some cities before 2010 (Solimar Research Group 2002). SOAR expires in 2030. The cities could propose ballot measures to amend the CURB ordinances over time in order to obtain more land for development.

4.3.4 Population Projections

The City of Simi Valley population was estimated by the Census Bureau in 2002 to be 116,562. Since 1980, the population has increased by 29 percent. Simi Valley population is projected to be 144,800 in 2025 (FAIR 2002). SOAR estimates population levels for Simi Valley will be 145,076 in 2025 (SOAR 2001). The City of Moorpark is projected to grow from estimated 31,000 to 53,000 by 2025 (SOAR 2001). Ventura County population is anticipated to grow 31 percent by 2020 and Los Angeles is projected to increase by 25 percent (SCAG 1998). Housing is projected to be constructed within Moorpark and Simi Valley and in rezoned grazing and agricultural land of Ventura County (SCAG 2001).

The future increase in population density is predicted in the County lands incorporated into the Cities of Moorpark, Simi Valley, and Los Angeles (Figure A8). Within the next five years, there may not be opportunities for wildlife corridors to be protected unless currently proposed projects are properly designed to accommodate large-sized mammal movement between the Santa Susana Mountains and the Simi Hills. Properly placed and designed wildlife passageways, linkages, and regional wildlife corridors are especially important if the projects encompassing hundreds and thousands of acres are approved to be annexed to the Cities of Moorpark, Simi Valley, Los Angeles, Thousand Oaks, and Camarillo.

4.4 WILDLIFE CORRIDOR – VIABLE OPTIONS

4.4.1 South Coast Missing Linkages Project – Santa Monica Mountains to Los Padres National Forest

The South Coast Wildlands Project is a collaboration of several government natural resource agencies to develop a habitat connectivity plan for the South Coast Ecoregion. Ecologists conducted an intensive research project to determine the most suitable location for a wildlife corridor from the Santa Monica Mountains to the Los Padres National Forest (SCWP 2004, *report in preparation*). GIS landscape permeability analysis was used to determine the least-cost corridor between habitat core areas.

In the vicinity of the SR-118 wildlife corridor assessment study area, the results of the least-cost corridor analysis placed wildlife corridors through the Santa Susana Pass (Santa Susana Pass Wildlife Corridor) and through Balcolm Canyon (Las Posas Wildlife Corridor) which is located between Camarillo and Moorpark (Figure A2). There were no wildlife corridors designated between Moorpark and the City of Simi Valley in the top 3 percent of least-cost corridors for mountain lions. In the top 5 percent of possible corridor alternatives, there is a mountain lion corridor from Tierra Rejada Valley through Oak Park Campground-Alamos Canyon area to Big Mountain, although it is less permeable than the Santa Susana Pass and Las Posas wildlife corridors.

Table F is a list of the SR-118 crossings included as part of this SR-118 wildlife corridor assessment study. Also, included in this table are other canyons and washes through the City of Simi Valley that are part of the top 5 percent of the least-cost corridors of the South Coast Wildlands Project study. The crossings are listed from west to east and ranked by relative permeability between the top 5 percent of the least-cost corridors for mountain lions between the Simi Hills and Santa Susana Mountains. Refer to Figures A2 or B2 for map of the study crossings, parks, and canyons locations.

TABLE F – Simi Hills to Santa Susana Mountain Wildlife Linkages Ranking based on DRAFT Map of Least-Cost Corridor (5%) Scenario 2 for Mountain Lion by South Coast Wildlands Project. Feb. 2004.

Linkage	Permeability Ranking
Tierra Rejada Valley to Big Mountain Corridor	
Arroyo Simi to Happy Camp	9
Collins Tunnel	9
Tierra Rejada Valley Greenbelt (SR-23)	7
Bard Reservoir	7
Wood Ranch Open Space	7
Oak Park Campground, City of Simi Valley	7
Alamos Canyon West	8
Alamos Canyon East	9
Simi Valley Landfill	9
Tributaries to Arroyo Simi located in the City of Simi Valley	
Dry Canyon	10
Tapo Canyon	10
Las Lajas Canyon	5
Santa Susana Pass Corridor	
Hummingbird Creek	6
Corriganville Park and Rocky Peak Park	1
Rocky Peak Road (Rocky Peak Park)	2
Santa Susana Arch (Santa Susana Mountains State Historic Park and Joughi Park)	3
Movie Lane (Garden of the Gods)	9
Canoga Avenue (Devils Canyon)	8
Browns Creek	9

NOTE. Linkage Permeability Ranking is based on applying a numerical rank to the GIS color scale used on the least cost corridor map. The number 1 represents the most permeable and 10 is least permeable between the top 5% of the corridors that have the least cost to mountain lion movement using GIS landscape permeability analysis based on LSA map interpretation.

4.4.2 Tierra Rejada Valley to Big Mountain Wildlife Corridor

Arroyo Simi to Happy Camp Canyon. During a reconnaissance visit to the study area, LSA biologists investigated the viability of a wildlife corridor across SR-118 and SR-23. The biologists observed that Happy Camp Regional Park Open Space abruptly ends at dense tract of houses near SR-118. Besides residential and commercial development north of SR-118 in Moorpark, a steep cliff, tall chain link fencing, and a cement processing plant blocks north-south wildlife movement into Arroyo Simi at the SR-118/23 viaduct crossing. A functioning Happy Camp Canyon linkage to Arroyo Simi does not appear to exist, even with the conserved park and open space north of High Street/Los Angeles Avenue. Additional residential projects have been approved or are currently under construction in the approximately 1,800 acres of previously rural or undeveloped land in northwest Moorpark (Figure B2).

Tierra Rejada Valley. Rural, agricultural or undeveloped land with dedicated parks and open space are located west and east of SR-23 between the Cities of Simi Valley on the east, Moorpark to the west, and Thousand Oaks to the south. Tierra Rejada Greenbelt and other dedicated parks and open space areas along SR-23 between Los Angeles Avenue and Olsen Road allow for wildlife movement in Tierra Rejada Valley and Santa Rosa Canyon. Tierra Rejada Park and Mt. McCoy Recreational Area are located south of SR-118. These recreational areas straddle Tierra Rejada Road in the west end of Simi Valley. Bard Reservoir, Lang Ranch, Woodridge and Wood Ranch Parks, and Open Space provide habitat linkages from Santa Monica Mountains Recreation Area and Tierra Rejada Valley. Bridge Path is an exclusive equestrian community with thousands of acres of dedicated open space in west Simi Hills. Development and roads constrain movement from the national recreation areas to Arroyo Simi along the west end of the Simi Hills. The width of open space is not as wide or as contiguous as the open space in the eastern end of Simi Hills and the Santa Susana Pass area.

Bard Reservoir. Psomas (2002) reported in its regional wildlife corridor report that Bard Reservoir perimeter is fenced. This fencing could constrain wildlife movement from Simi Valley to Tierra Rejada Valley. The reservoir area is designated as open space at the present time. It is possible that the impediments to wildlife movement around the reservoir have been or could be minimized since the reservoir is now designated as open space.

Northeast of Moorpark. Faulker Canyon, Alamos Canyon, Oak Park, Simi Valley Landfill, and Brea Canyon are located north of SR-118 in Ventura County, the northeastern undeveloped areas of the City of Moorpark, and northwestern end of the City of Simi Valley. The only development present north of SR-118 is the Moorpark College and Simi Valley Landfill. A few dirt roads occur in the canyons and ridges.

Constraints. Currently, the usefulness of this corridor as a large mammal linkage between the Santa Susana Mountains and the Simi Hills could be negated by three proposed projects: North Park Village, The Canyons, and Belcaro senior community and golf course. The Belcaro project is located within the limits of the City of Simi Valley, but the other specific plans require a SOAR initiative. If these projects are to be built, then accommodating wildlife movement through the dedication of wildlife corridors should be an important part of the development designs in order to create and preserve the habitat connectivity between open space areas north and south of SR-118.

The open space designations in Tierra Rejada Valley and west Simi Hills have created a two-mile wide linkage in Tierra Rejada Valley east of SR-23. The open space areas narrow to 3,000 feet north of Oak Park and south of the Bridle Path community. A one-mile wide linkage is across SR-23 between Thousand Oaks and Simi Valley. There is a known wildlife crossing located south of the Tierra Rejada Road and SR-23 interchange in Santa Rosa Canyon (SMMC 2002). Dedicated open space occurs on both sides of SR-23 at this crossing location.

Most Beneficial Enhancement Proposals for Tierra Rejada Valley to Big Mountain Corridor.

Currently, large mammals (mountain lion, mule deer, bobcat, and coyote) are dispersing through the undeveloped areas south of SR-118 from Collins Avenue to Madera Road as observed during the year-long tracking and camera survey. Improvements to permeability across SR-118 and preserving additional wildlife habitat would encourage wildlife movement through the west end of Simi Valley.

The most beneficial enhancement proposal would be increasing permeability between currently undeveloped habitat at Oak Park and Alamos Canyon. The most important aspect of this enhancement proposal is the large undercrossing under Los Angeles Avenue between the mobile home park and the cement processing plant. The other necessary enhancements would include enlarging a culvert located west of Oak Park Campground, either culvert 6 or 7 as shown on Figure A4.

The permeability of Alamos Canyon needs to be improved, especially if additional commercial and residential development is approved for this location. The openness of the Alamos West Canyon double culvert needs to be increased by removing deposited sediment, with minimal disturbance to riparian trees and shrubs, and by reducing the pitch of the ramps leading to the north end culvert openings. After completion of maintenance or construction, any disturbed areas should be planted with native riparian vegetation.

In order to ensure the function of the West Canyon linkage, the railroad undercrossing and Los Angeles Avenue culvert need to be enlarged to accommodate large mammals. Wildlife can be encouraged to use the road undercrossings by erecting wildlife fencing (8-foot high chain link) (Figure A4). Alamos Canyon wash enters Arroyo Simi west of the water treatment plant. Wildlife fencing should be installed along the banks of the wash to direct wildlife out onto the Arroyo Simi floodplain.

The other enhancement option recommended for this linkage is allowing wildlife movement across the north end of Oak Park Campground by relocating the fence a few hundred feet south of the Caltrans right-of-way.

Regional Wildlife Corridor Viability. Land conservation would be required to ensure the function of this linkage. Conservation easements would need to be obtained north and south of SR-118 and south of Los Angeles Avenue. Riparian and oak woodland restoration and protection would also be required within the habitat linkage. Highway and road structures should include large undercrossings, bridges, or viaducts for large mammal movement (Figure A4).

4.4.3 Santa Susana Pass Wildlife Corridor

The Santa Susana Pass wildlife corridor offers the least developed and the contiguous open space of any corridor along SR-118. This corridor encompasses Hummingbird Creek, Corriganville Park Equestrian Tunnel, Rocky Peak Overpass, Santa Susana Arch, Canoga Avenue, and Browns Canyon.

The focus on wildlife corridor viability at Santa Susana Pass should be protecting the current use of the linkage by mountain lions and enhancing the permeability on the north and south sides of SR-118 through improvements in passageway structures and changes in land use.

Corriganville Park. The Santa Susana Pass corridor was determined by the South Coast Wildlands Project (2004) as being the most permeable corridor for mountain lion movement along the SR-118 study area. This corridor is already widely used by wildlife to access both sides of SR-118. The viability of the Santa Susana Pass Linkage is highly dependent upon the wildlife accessibility to the Corriganville Equestrian Tunnel. Corriganville Equestrian Tunnel is known by the National Park Service to be used frequently by at least one mountain lion. This crossing should be dedicated to wildlife use only. Closing the Wildlife Corridor Trail and fencing around parking lot to minimize human disturbance is recommend as a minimum cost enhancement proposal at Corriganville Park. A much higher cost enhancement proposal is to build a green bridge (vegetated land-bridge) over SR-118 to connect the two parks with a contiguous habitat connection (Figure A5). This crossing location is crucial to the viability of the Santa Susana Pass Wildlife Corridor. Ensuring the long-term use of this two-mile wide stretch of conserved open space along SR-118 is an important land planning and management goal for this regional wildlife corridor linkage.

Increasing the permeability of the Santa Susana Pass Corridor would entail improving the crossing at Rocky Peak Road, most importantly, and then possibly at Santa Susana Arch and Hummingbird Creek.

Rocky Peak Road. Deer, bobcat, and coyote are known to use the habitat areas along Santa Susana Road and Rocky Peak Park. Wildlife sign was observed during the wildlife tracking survey and by Caltrans biologists during field surveys for the Rocky Peak Road project. An additional wildlife crossing would be beneficial to improve the permeability of the Santa Susana Pass Wildlife Corridor across SR-118. Using the existing bridge structure, the crossing could be enhanced to encourage and facilitate wildlife movement between the two expansive open space areas. The preferred enhancement proposal is to convert the vehicle overcrossing into a vegetated land bridge with a dirt road/trail for fire, park and recreational use. Vehicle parking would be confined to the overflow parking lot off of Santa Susana Pass Road. A solid fence would be placed along the sides of the bridge to block the view of the freeway below. The existing paved ramps would be closed. All four of the ramp pads would be restored with native vegetation. Wildlife fencing would be erected to direct wildlife to the green bridge.

The purpose of the Rocky Peak Road Improvements project was to accommodate future vehicle demands, provide emergency vehicle turn-around, and to allow vehicles more access to Santa Susana Road during traffic delays on SR-118. Possibly, these traffic needs could be met by constructing on and off-ramps at Movie Lane or Iverson Road which are located in more urbanized areas and would not impact wildlife conservation lands.

Possibly, if Rocky Peak Road ramps are completed, then the Santa Susana Arch could be enlarged through tunnel jacking to mitigate for the increased level of impact associated with higher vehicle traffic and human-use of the surrounding open spaces. This enhancement would provide potential highway crossing locations on both sides of the Pass.

Santa Susana Arch. Santa Susana Arch is located between Joughi Park, a recently dedicated as SMMC open space, and Santa Susana Mountains State Historic Park. This culvert was frequently used by raccoons and could be used by large-sized mammals if enlarged through tunnel-jacking. Although it is a long culvert, dispersing juvenile mountain lions are known to use a box culvert 625 feet long (Beier 1995) and lions may use this Arch if it is enlarged through tunnel jacking.

Hummingbird Creek. Simple enhancement proposals are suggested for Hummingbird Creek, since the culvert is large enough to accommodate large-sized mammals. Enhancements include not blocking the culvert entrances with debris basins or traps, planting native vegetation to provide wildlife movement cover and relocating fencing to allow passage from Hummingbird Creek Canyon to Corriganville Park. Street lighting will need to be removed, shielded, or directed away from the culvert and open space areas.

Canoga Avenue and Browns Canyon. Devil's Canyon and Browns Canyon are located east of Santa Susana Pass Wildlife Corridor. Areas within these canyons are zoned as parks and recreational areas. These areas are contiguous with Santa Susana Mountains Historical Park, Corriganville Park, and Rocky Peak Park. Devil's Canyon open space is accessible from the Santa Susana Mountains Historic State Park via the Canoga Avenue undercrossing. In addition to providing a north-south linkage at the Canoga Avenue crossing, these canyon parks are important for maintaining a buffer from human development for the Santa Susana Pass Wildlife Corridor and as part of the large tracts of habitat conservation areas required for large mammals. Enhancement proposed includes planting native vegetation, realigning highway fencing and extending the equestrian rail fence to connect to the regional trail system access points.

Constraints. If the Rocky Peak Road Project Improvements (westbound on-ramps and eastbound off-ramps) are constructed as proposed instead of the Rocky Peak green bridge, then the increase traffic on the overcrossing and onto the Santa Susana Pass Road will adversely impact wildlife movement through the Santa Susana Pass Wildlife Corridor. Increased traffic, noise, lighting during the night negatively impacts mountain lion and other nocturnal wildlife movement. Increased recreational use at the crossing will also occur through the greater accessibility by the east-bound SR-118 traffic.

Corriganville Park improvements must be properly planned to avoid disturbing nocturnal wildlife movement. Night lighting should be minimal, e.g., only foot-level sidewalk lighting. Overnight camping and other evening activities should be limited to near the parking areas. Ideally, recreational use at the park should be restricted to day use only.

Most Beneficial Wildlife Crossing Enhancement Proposals for Santa Susana Pass Wildlife Corridor. The most beneficial and least expensive crossing enhancement would be to limit human-use of the open space in the Santa Susana Pass. The benefit of erecting a green bridge would need to be balanced by the amount of land disturbance and whether the construction activities would permanently disrupt the current wildlife use of the corridor. Currently, mountain lion, deer and other wildlife species use the equestrian tunnel. On the other hand, green bridges have been shown to be the

preferred route by large mammals in Europe and U.S. National Parks (FHWA 2002) and any temporary disruptions would be greatly offset by the future increased permeability at Corriganville and Rocky Peak Parks. A green bridge would also be beneficial to a greater variety of wildlife species, large and small, than the equestrian tunnel.

Typically, mountain lions follow topographic features, such as ridges and canyons, and dirt trails to move through an area, and repeatedly use the same crossing location. Closing Rocky Peak Road and other proposed crossing enhancements would require the discovery of these new crossings by dispersing mountain lions. Juvenile mountain lions disperse through new territory by avoiding lights and staying inside the dark belt between urbanized areas (Beier 1995). The enhanced crossings must be within a dark habitat buffer in order for wildlife to move through the adjacent habitat areas to discover the new passageway and to use the crossing. Any street lighting at Rocky Peak Road will need to be removed.

Regional Wildlife Corridor Viability. The Santa Susana Pass Corridor is one of two of the most important wildlife corridors from the Ventura County coastal range to the Los Padres National Forest. The other most important wildlife corridor is the Balcom Canyon least-cost corridor (SMMC 2004). Ensuring the future regional viability of the Santa Susana Pass corridor depends upon the dedication of additional expansive tracts of land. North of SR-118, this would require additional land in Blind Canyon, Brown Canyon, Devil's Canyon, Chico Canyon, Las Lajas Canyon, Tapo Canyon, Windmill Canyon, and Oat Mountain. South of SR-118, the Brandeis-Bardin Institute owns a 3,000-acre ranch property located in Ventura County north of the Rocketdyne facility. The majority of the land is undeveloped open space while the campus and other facilities are located at the end of Tapo Canyon Road just outside the City of Simi Valley. Land conservation opportunities include undeveloped land around Runkle Reservoir, Black Canyon, and the Santa Susana Field Laboratory (Rocketdyne facility). If this facility is ever decommissioned, then dedication of the property as open space, instead of an industrial or business park, would be highly beneficial to maintaining the regional habitat connectivity of the Santa Susana Pass Wildlife Corridor. Human and wildlife access to the land near and on the Rocketdyne facility should be permitted only where hazardous materials and nuclear contamination levels are known to be below accepted health risk levels. For more information on the environmental contamination issues, refer to the California Department of Toxic Substances Control (2002), Boeing Rocketdyne Propulsion & Power Division (Boeing 2000) and recent news articles (Felkins 2004).

4.5 PRIORITY OF WILDLIFE CROSSING ENHANCEMENT PROPOSALS

The highest priority should be given to enhancement proposals for the Santa Susana Pass Wildlife Corridor (Table G). These enhancement proposals will increase the permeability of the corridor and further reduce the costs associated with wildlife movement through the Pass. Committing Corriganville Park and Rocky Peak Park to serve primarily as a wildlife linkage instead of a recreational area would enhance the function of the regional wildlife corridor. Increasing the permeability across SR-118 is important for increasing the wildlife use of the linkage. A green bridge would be the most effective in reconnecting the Santa Susana Pass natural areas. Secondly, committing more span of the Pass to large-sized wildlife movement would involve converting Rocky Peak Pass to a green bridge and/or enlarging Santa Susana Arch.

Table G – List of Crossing Enhancement Proposals from Highest Priority to Lowest based on Importance to Wildlife Corridor Viability

Crossing Enhancement Proposal	Ranked Biological Importance	Ranked Costs
Santa Susana Pass Limit Human Usage	1	Low
Corriganville Green Bridge	2	High
Rocky Peak Road Closure	5	Moderate
Oak Park Linkage	3	High
Alamos Canyon West Canyon Linkage	4	High
Santa Susana Arch	6	High
Hummingbird Creek	7	Low
Canoga Avenue	8	Low

NOTE: Ranked Biological Importance is based on a scale of 1 to 10 with 1 being the most important to wildlife corridor viability. Ranked Costs are generalizations of potential project costs. Low being less than \$500,000, Moderate estimated at \$500,000 to \$2,000,000 and High as over \$2,000,000.

Creating and conserving a wildlife linkage in western Simi Valley was part of the South Coast Wildlands Project’s vision as described in the *California Wildlands Project: A Vision for Wild California* report prepared by the steering committee meeting held in 1999 (SCWP 2000). A wildlife linkage between the conserved open space areas in Tierra Rejada Valley and western Simi Hills with the undeveloped lands north of SR-118 would be highly beneficial to ensuring habitat connectivity and wildlife movement in west Simi Valley. The undeveloped lands along Arroyo Simi near Oak Park and Alamos Canyon can be linked to the north canyon lands through culvert enlargement and undercrossing installation under Los Angeles Avenue, the railroad, and SR-118. Mountain lion, deer, bobcat, and coyote have been observed in the undeveloped areas between the urbanized areas of Moorpark and Simi Valley. Increasing the wildlife movement permeability of SR-118 in both the western and eastern part of Simi Valley would be beneficial to wildlife of the region.

There is still a window of opportunity at the current state of development in the Cities of Moorpark, Simi Valley, and the County of Ventura to create a wildlife corridor to the Santa Susana Mountains through the western valley area. Proposed development, commercial, and road projects should receive incentives to construct large-sized mammal passageways over drainages and under roads, excavating tunnels for roads instead road cuts, and designing adequate wildlife habitat crossings/linkages (at least 1,000 feet wide), and contiguous open space areas (at least 2 miles wide) between the development projects.

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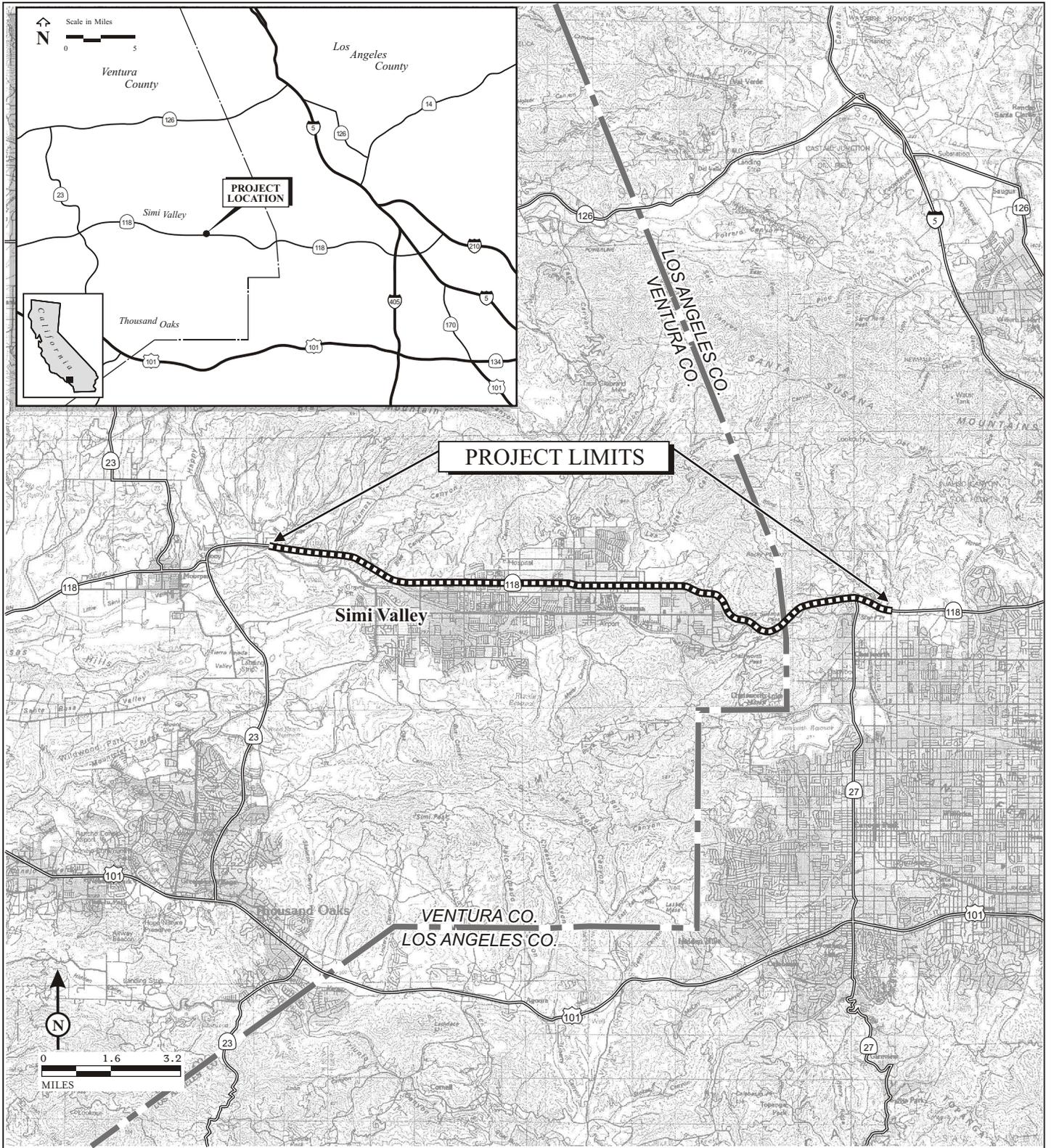
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APPENDIX A

FIGURES



LSA

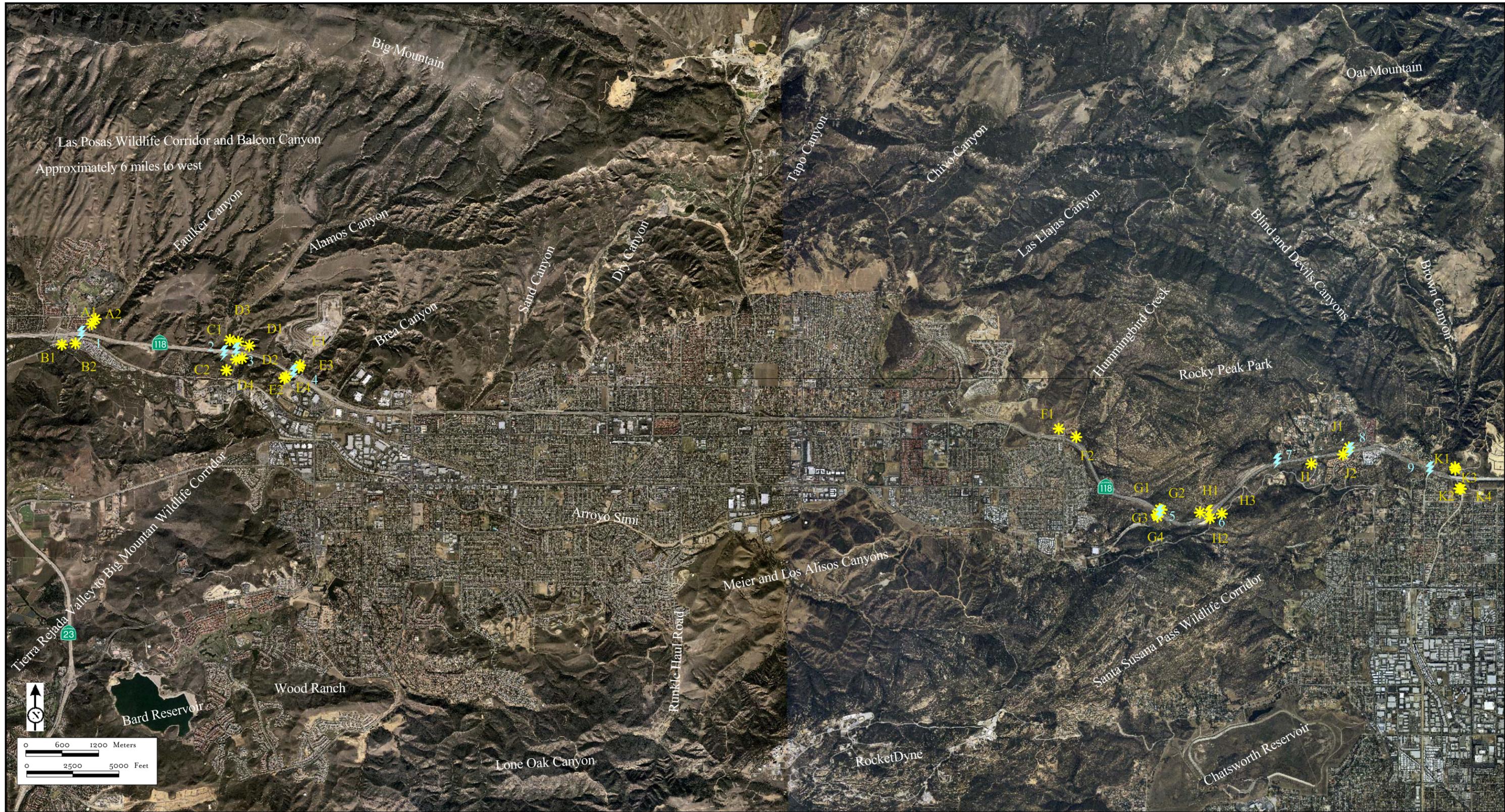
FIGURE A1

 PROJECT LIMITS

Ventura 118 Wildlife Study
 Final Report
 Regional and Location Map

SOURCE: USGS 30"x 60" QUAD, LOS ANGELES, CA. 1979.

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LSA

⚡ CAMERA STATIONS

1. COLLINS DRIVE BOX CULVERT
2. ALAMOS CANYON WEST RCP CULVERT
3. ALAMOS CANYON UNDERPASS
4. SIMI VALLEY LANDFILL CMP CULVERT
5. CORRIGANVILLE PARK EQUESTRIAN TUNNEL
6. ROCKY PEAK OVERCROSSING
7. SANTA SUSANA ARCH
8. MOVIE LANE OVERCROSSING
9. CANOGA AVENUE UNDERPASS

★ SCENT STATIONS

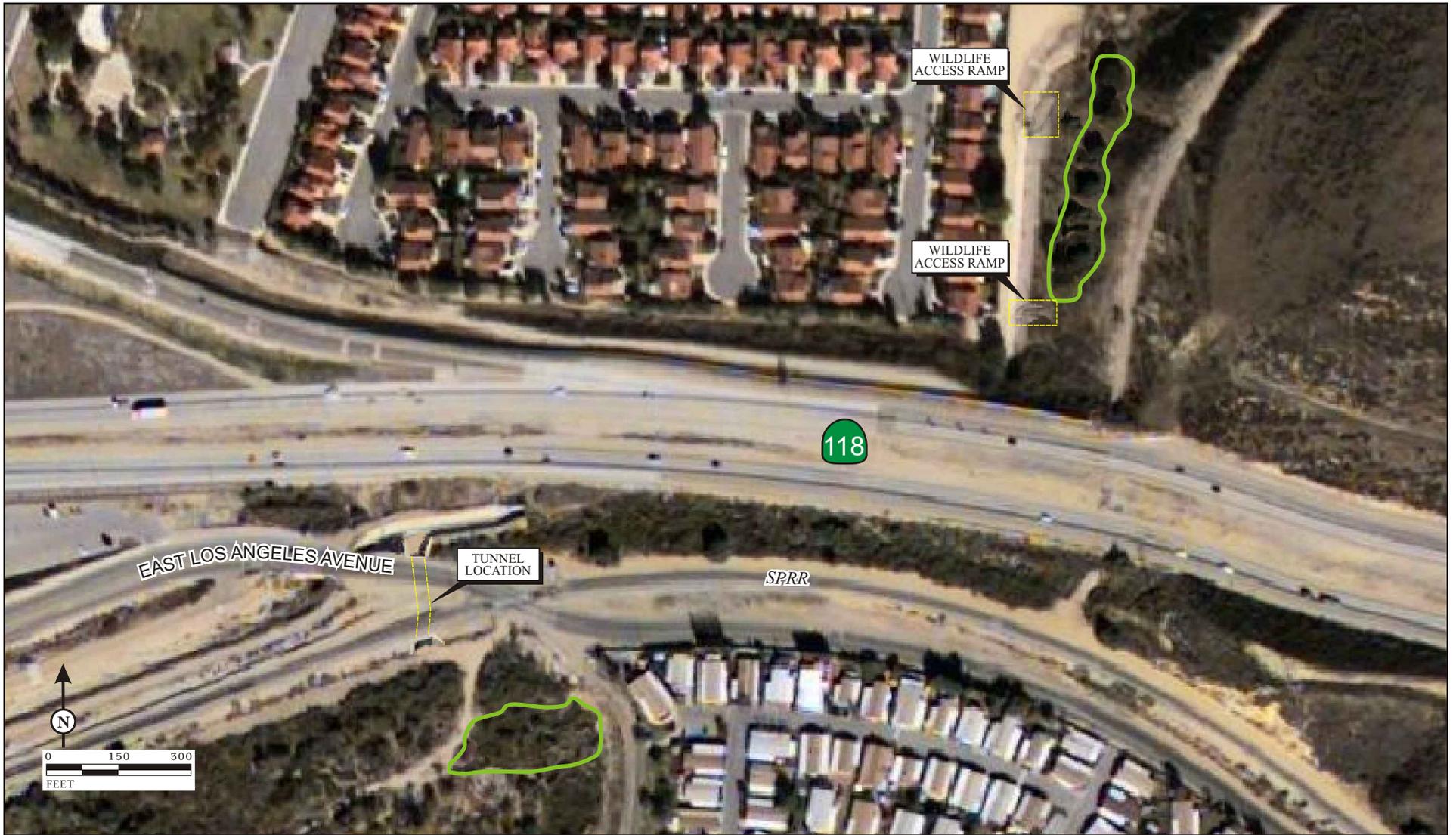
- A1. COLLINS DRIVE NORTH-CHANNEL
- A2. COLLINS DRIVE NORTH-UTILITY ACCESS ROAD
- B1. COLLINS DRIVE SOUTH-WEST OF CREEK
- B2. COLLINS DRIVE SOUTH- EAST OF DIRT ROAD
- C1. ALAMOS CANYON NORTH-WEST CANYON
- C2. ALAMOS CANYON SOUTH- WEST CANYON
- D1. ALAMOS CANYON NORTH-- EAST CANYON
- D2. ALAMOS CANYON SOUTH- EAST CANYON
- D3. ALAMOS CANYON NORTH- ALAMOS CANYON ROAD
- D4. ALAMOS CANYON SOUTH- ALAMOS CANYON ROAD
- E1. SIMI VALLEY LANDFILL NORTH- CANYON BENCH
- E2. SIMI VALLEY LANDFILL SOUTH- IN R.O.W.
- E3. SIMI VALLEY LANDFILL NORTH- AT SPILLWAY
- E4. SIMI VALLEY LANDFILL SOUTH- CREEK BANK

- F1. WHITE OAK PARK OPEN SPACE
- F2. HUMMINGBIRD CREEK
- G1. CORRIGANVILLE TUNNEL NORTH- (WEST)
- G2. CORRIGANVILLE TUNNEL NORTH- (EAST)
- G3. CORRIGANVILLE TUNNEL SOUTH (WEST)
- G4. CORRIGANVILLE TUNNEL SOUTH (EAST)
- H1. ROCKY PEAK NORTH- IN R.O.W.
- H2. ROCKY PEAK SOUTH- RAVINE IN R.O.W.

- H3. ROCKY PEAK SOUTH- TRAIL
- I1. IVERSON ROAD SOUTH
- J1. MOVIE LANE NORTH
- J2. MOVIE LANE SOUTH
- K1. BROWNS CANYON CREEK NORTH- TOP OF DIKE
- K2. BROWNS CANYON CREEK SOUTH- WEST OF CREEK
- K3. BROWNS CANYON CREEK NORTH- BOTTOM OF DIKE
- K4. BROWNS CANYON CREEK SOUTH- EAST OF CREEK

Scent station locations are approximate and are for illustrative purposes only.
 Source: Photos - 2000 Digital OrthoMosaic'd Air Photos, SCAG/Emerge Inc.
 3/24/04 (I:\CDT230\gis\finalreportfigures.apr)

FIGURE A2



LSA

FIGURE A3

 HABITAT ENHANCEMENT AREA

Ventura 118 Wildlife Study
Final Report

Collins Avenue

Wildlife Linkage Enhancements

SOURCE: 2000 Digital OrthoMosaic'd Air Photos, SCAG/Emerge, Inc.

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Figure A4

LSA

- PHOTO STATION LOCATIONS
- SCENT STATION LOCATIONS

- ▬ EXISTING ROAD AT ALAMOS CANYON TO BE CHANGED TO DIRT
- ▬ PROPOSED ALAMOS CANYON WILDLIFE FUNNELING FENCE
- ▬ EXISTING ALAMOS CANYON CULVERTS (1-2)
- ▬ PROPOSED TUNNELS UNDER SR-118, EAST LOS ANGELES AVENUE AND SPRR (3-7)

Ventura 118 Wildlife Study
Final Report

Alamos Canyon Wildlife
Linkage Enhancements

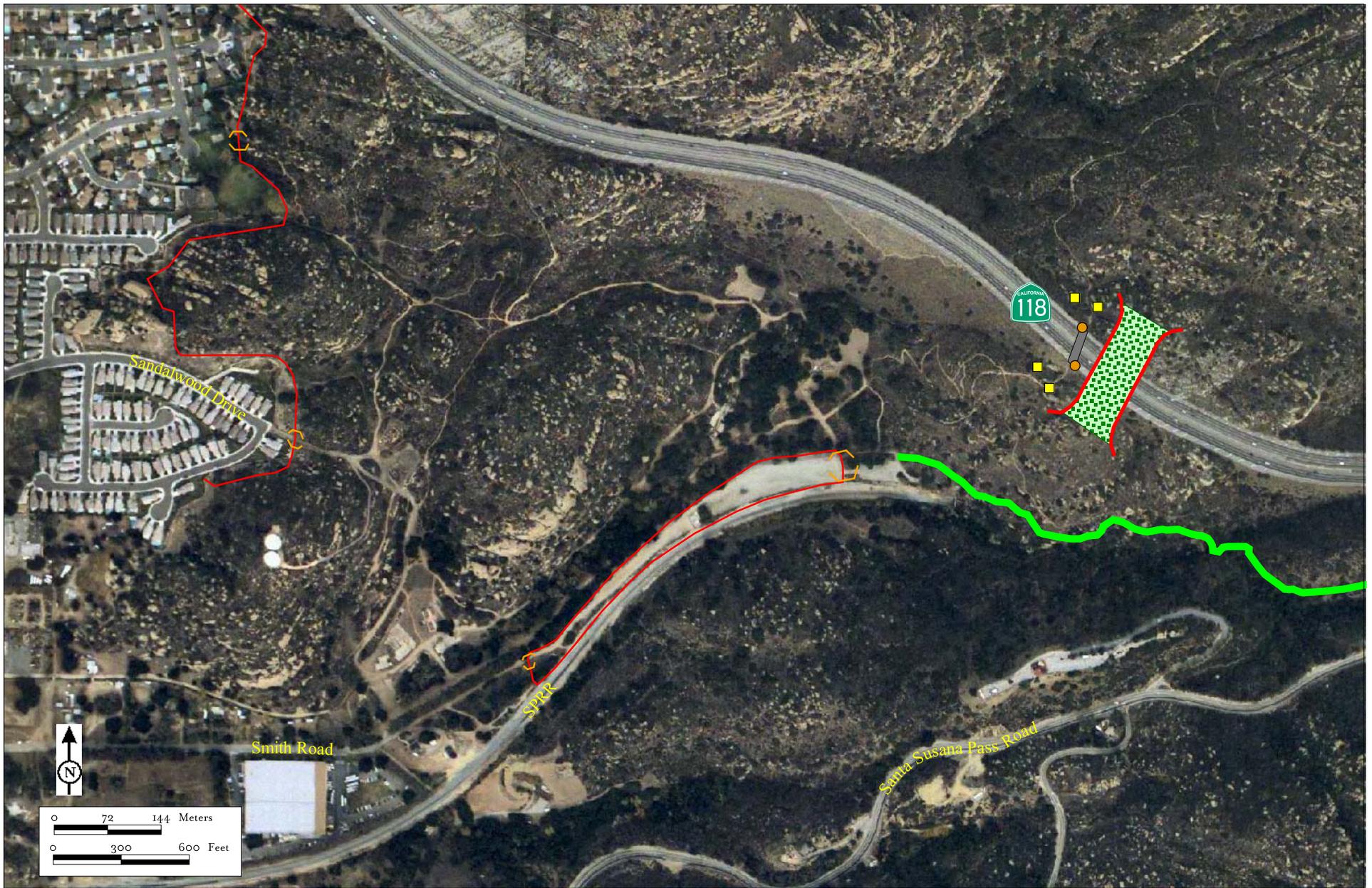


FIGURE A5

LSA

- PHOTO STATION LOCATIONS
- SCENT STATION LOCATIONS
- EXISTING CORRIGANVILLE TUNNEL
- STAGECOACH TRAIL LEADING TO ROCKY PEAK PARK
- PROPOSED CORRIGANVILLE LAND BRIDGE
- PROPOSED PARKING LOT, RESIDENTIAL AND LAND BRIDGE FENCE
- PROPOSED DAY USE GATES FOR FENCES

Ventura 118 Wildlife Study
Final Report

Corriganville Tunnel Wildlife
Linkage Enhancements



LSA

- PHOTO STATION LOCATIONS
- SCENT STATION LOCATIONS

- EXISTING HIKING AND EQUESTRIAN TRAILS AT CANOGA AVENUE
- ▾ PROPOSED CANOGA AVENUE WILDLIFE FUNNELING FENCE
- ▾ EXISTING PRIVATE PAVED ROAD

FIGURE A6

Ventura 118 Wildlife Study
Final Report

Canoga Avenue Wildlife
Linkage Enhancements



Before



After

LSA

FIGURE A7A

Ventura 118 Wildlife Study
Final Report
Canoga Avenue
Wildlife Linkage Enhancement



Before



After

LSA

FIGURE A7_B

Ventura 118 Wildlife Study
Final Report
Canoga Avenue
Wildlife Linkage Enhancement

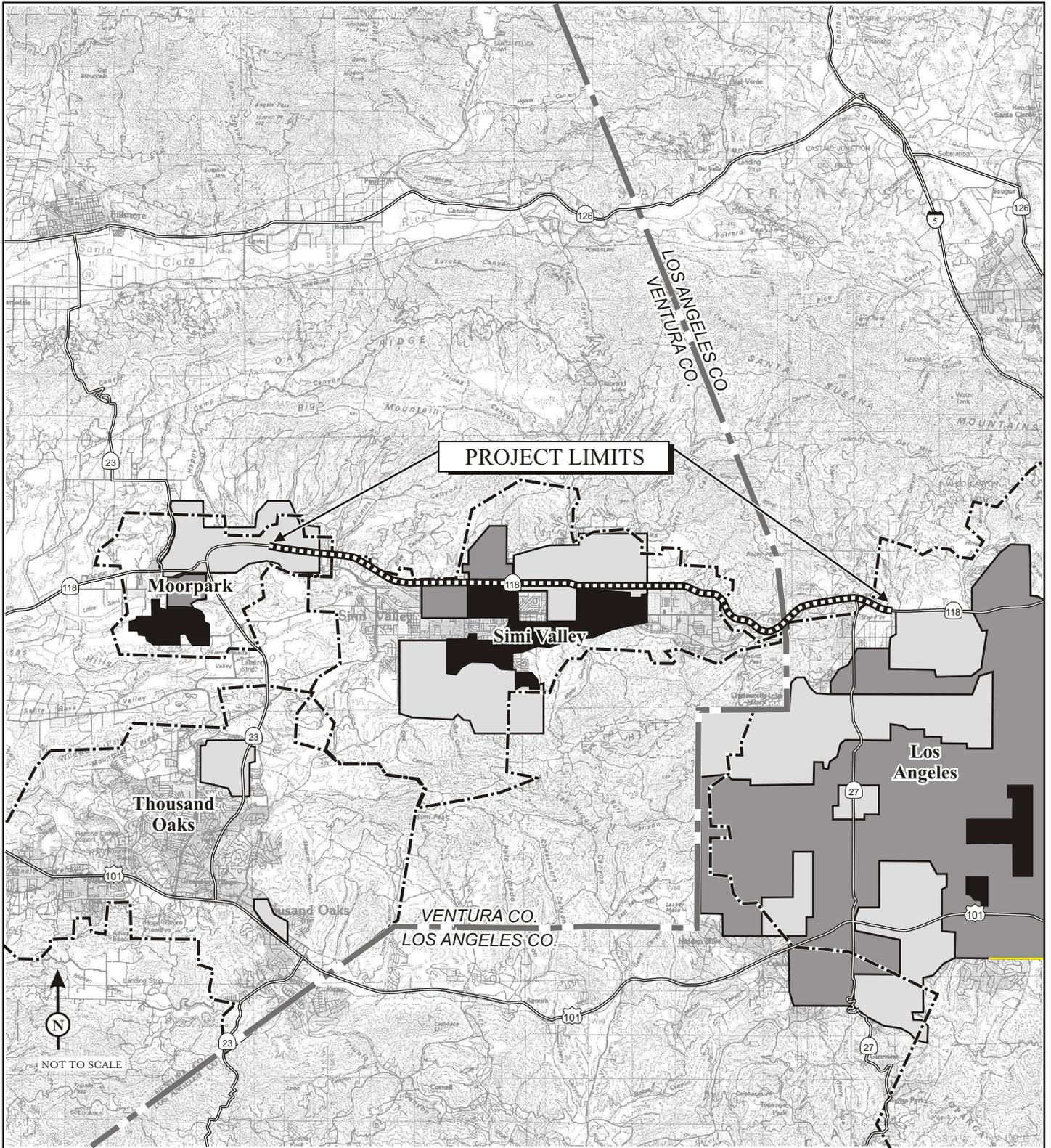
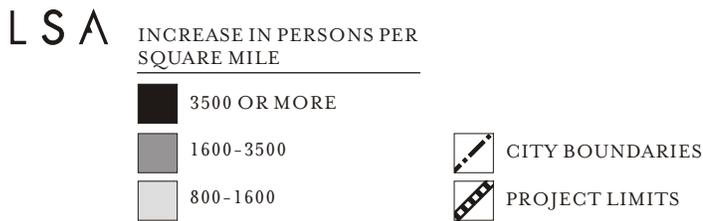


FIGURE A8



Ventura 118 Wildlife Study
Final Report
 Distribution of Population Increase
 Between 1997 & 2025

SOURCE: SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (2001)

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APPENDIX B

MAPS

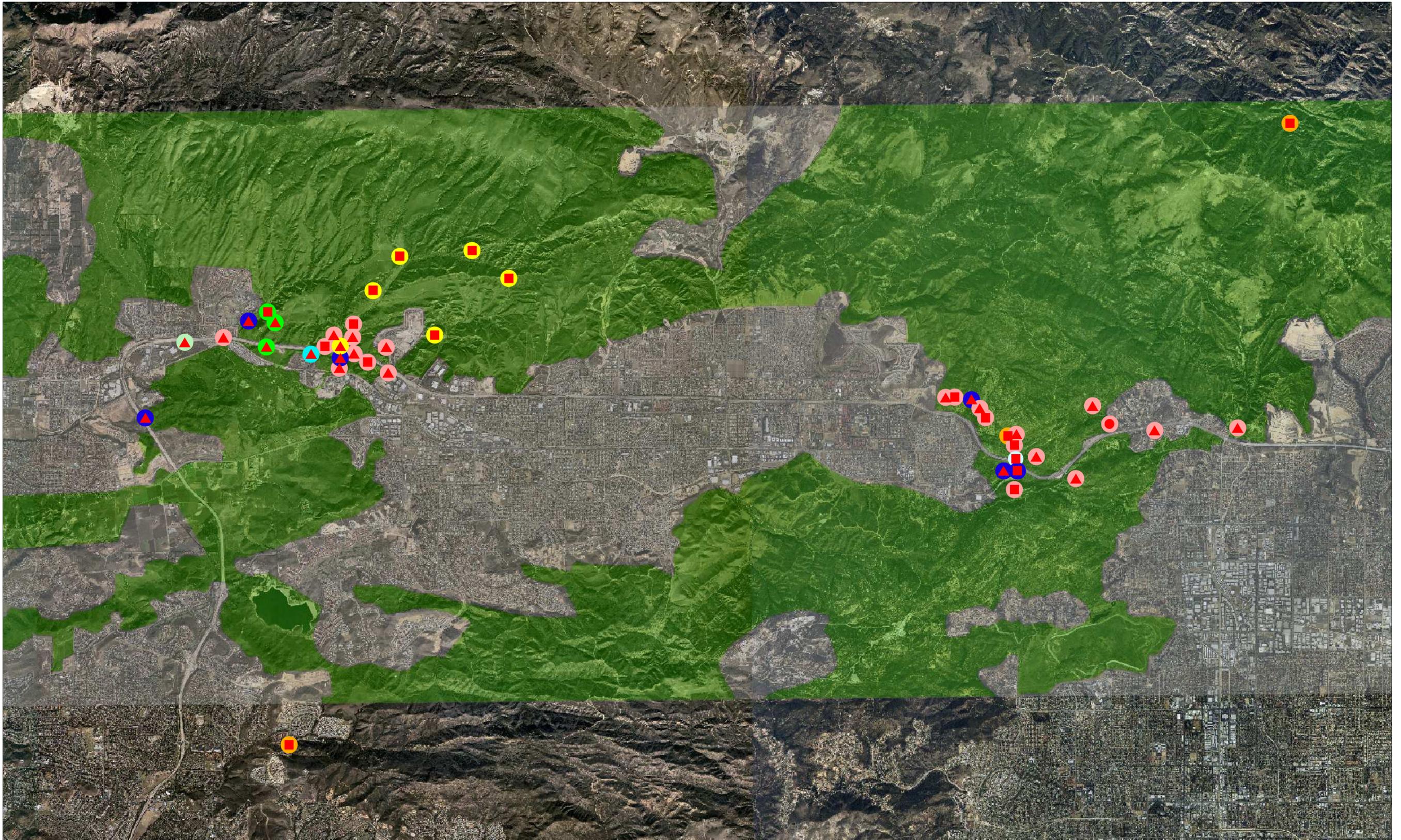
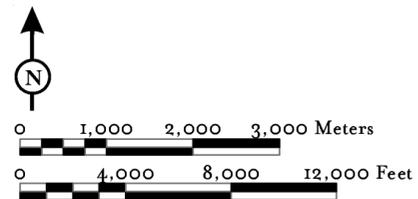


FIGURE B1

LSA

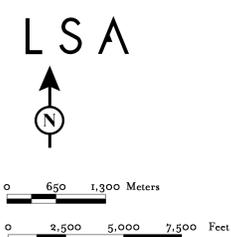
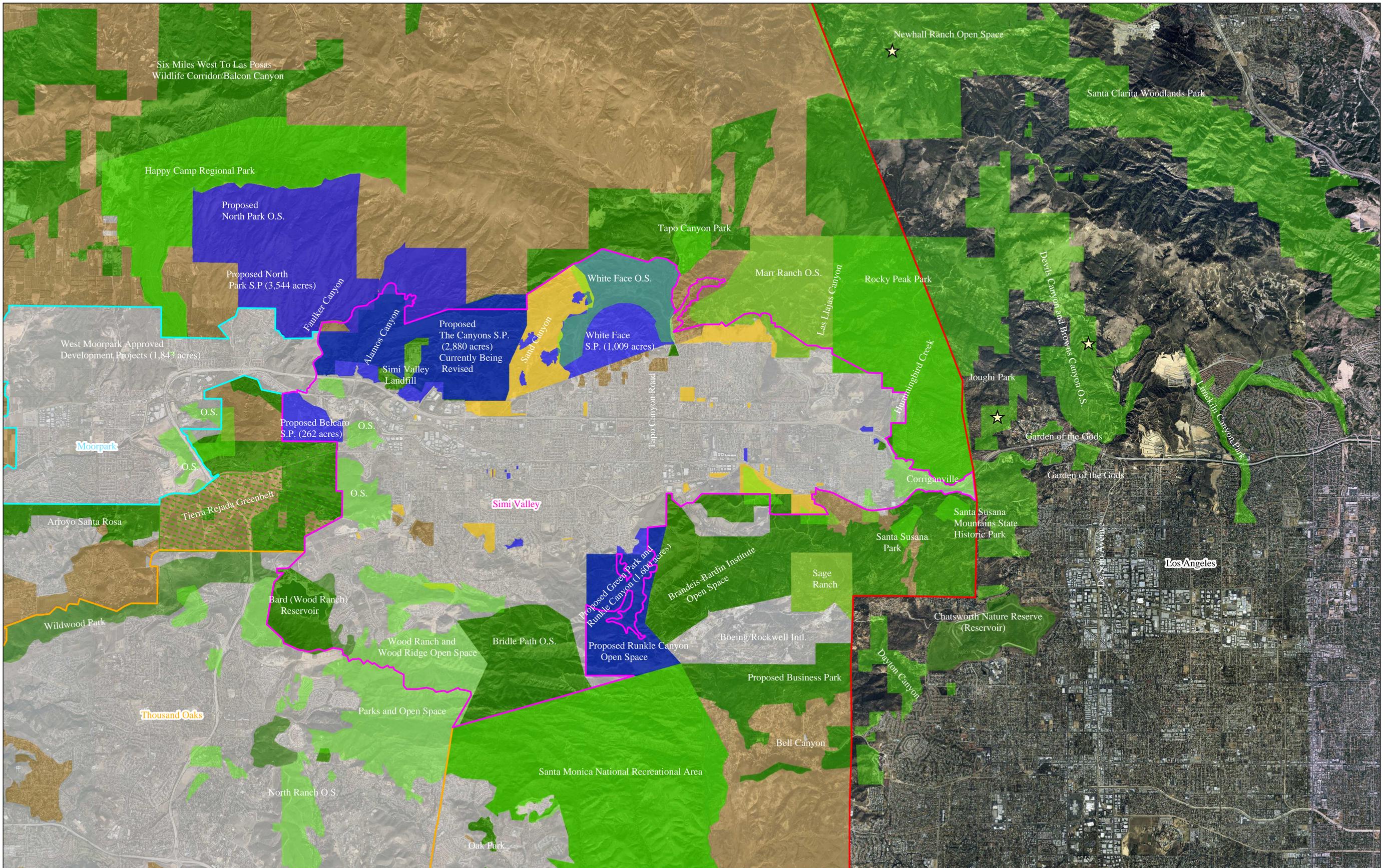


WILDLIFE SPECIES OBSERVED	COMPANY AND YEAR WILDLIFE OBSERVED	HABITAT LINKAGE AREAS WITHIN 4-MILE BUFFER OF STUDY AREA
▲ BOBCAT	● SMMC, 1991	■ DEVELOPED LAND AS OF 2000
■ MOUNTAIN LION	● MBA, 1993	■ UNDEVELOPED LAND AS OF 2000 (INCLUDING DEDICATED PARKS AND OPEN SPACE AS OF 2003)
● RACCOON	● PSOMAS, 1999-2000	
	● NG, 2000	
	● CAL TRANS, 2001	
	● BONTERRA, 2003	
	● LSA ASSOCIATES, INC., 2003-2004	
	● RILEY-NPS, 2004	

Ventura 118 Wildlife Study
Final Report

Wildlife Observation Map

Note: Wildlife observation locations are approximate and are for illustrative purposes only
SOURCE: Photo-2000 Digital Orthomosaic'd Air Photos, SCAG/Emerge Inc; Wildlife Data-Santa Monica Mountains Conservancy-1991, Michael Brandon & Associates Inc.-1993, Ng, Sandra-2000, Psomas-2002, BonTerra Consulting-2003, National Park Service-2004
5/26/04 (l:cdt230)gis/wildobs.mxd



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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>CITY CURB LIMITS</p> <ul style="list-style-type: none"> ▬ MOORPARK ▬ SIMI VALLEY ▬ THOUSAND OAKS | <p>LAND USES AS DESIGNATED BY CITY AND COUNTY GENERAL PLANS AS OF DECEMBER 2003</p> <ul style="list-style-type: none"> URBAN, DENSE RESIDENTIAL, INDUSTRIAL AND COMMERCIAL OPEN SPACE-NO GREATER THAN 1 DWELLING PER 20 ACRES RURAL AND AGRICULTURAL ☆ OPEN SPACE AREAS PENDING DEDICATION O.S.- OPEN SPACE S.P.- SPECIFIC PLAN | <p>SANTA MONICA MOUNTAINS CONSERVANCY-OPEN SPACE</p> <ul style="list-style-type: none"> APPROVED PROJECTS TIERRA REJADA GREENBELT PROPOSED PROJECTS |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

FIGURE B2

Note: County Land Use Data, City Curbs Limits and SMMC Data taken from different sources.
SOURCE: Photo 2000 Digital Ortho/Mosaic/4 Air Photos, SCAG/Emerge Inc.; County Limits, Vegetation Communities, Greenbelt Data-County of Ventura Resource Management Agency, 2004
05/26/04 (I:CDT)236 (gis/landusemap_anno.mxd)

APPENDIX C

**FINAL REPORT, QUARTERLY REPORTS, AND LITERATURE
REVIEW (ON CD-ROM)**