

Animal Activity Assessment in Connection with Proposed Land Development on the Salvation Army Property off Mussey Grade Road

Barry Martin

October 26, 2006

Background: San Diego Tracking Team has been requested by the Mussey Grade Road Alliance to conduct wildlife track and sign surveys on land surrounding the Salvation Army property (Figure 1). The purpose of these surveys was to discern primarily what mammal species are present in the area and to identify naturally occurring wildlife movement corridors gauging their overall health and utility via track and sign evidence.

Methodology: The transect surveys were conducted by seasoned San Diego Tracking Team (SDTT) members that have undergone International testing for wildlife track and sign interpretation and received Track and Sign II or III certification conducted in San Diego by Mark Elbroch (2006). Surveys for this study were conducted on five dates in December 2005, and January, May, and June 2006.

Access was granted for locations bordering the Salvation Army property in various key areas. Six survey transects were set up with specified start-end points and transect segments of varying length defined by Global Positioning System (GPS) checkpoints (Figure 1). A transect description was prepared for each transect (Appendix 1). Transects varied in length from 418 to 3,010 meters long and included an average width of 9 meters. A reconnaissance was performed in December 2005 and transects were subsequently surveyed on a one-time basis (i.e., Transects 1-3 in January 2006, Transects 4 and 5 in May 10/26/06

2006, and Transect 6 in June 2006). The SDTT wildlife survey form used for long-term wildlife monitoring was employed for this study. Data were collected for evidence (sign) of 11 mammal species considered focal to this study, including mountain lion (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), American badger (*Taxidea taxus jeffersoni*), long-tailed weasel (*Mustela frenata*), ringtail (*Bassariscus astutus*), western spotted skunk (*Spilogale gracilis*), and San Diego black-tailed jackrabbit (*Lepus californica bennettii*).

All observations of tracks or sign of the focal species were recorded on the data sheets according to the GPS defined transect segment and mapped onto an aerial photograph (1" = 600' scale) with topography (40-foot contour intervals). Data collected along each transect segment included the number of passes or observations per species (described below), the type of evidence observed (i.e., tracks, scat, scrapes, browse, bedding areas, fur, bones, prey cache, sighting, etc.), age of evidence (i.e., fresh or historic), tracking conditions (i.e., excellent, good, or poor), topography (flat, moderate or steep slope, ridgeline, etc), habitat type (i.e., grassland, oak riparian, etc.), and presence and type of prey (cottontails, skunks, ground squirrels, small rodents, etc.). General observations were noted regarding indicators of the overall health of areas we surveyed.

The surveys provided an indication of activity level and directions of travel for focal species in various geographic areas. We recorded the number of passes of animals (i.e., observations of sign) using identification of tracks and other sign. The term pass generally indicates the movement of one animal at one point in time through a specific area. An example would be a set of tracks from one individual traveling at a specific time in a specific direction. Whether tracks of 3 different coyotes or 3 passes of the same coyote were observed, in either case 3 passes would be recorded. These data cannot be used to estimate wildlife

population densities, however, they provide an indication of the relative activity levels of various focal species in an area.

Focal Mammal Species: Focal species were selected on the basis of providing a role as large carnivores (mountain lion, coyote, and bobcat), large prey (mule deer), meso-predators (gray fox, raccoon) or sensitive species and habitat specialists (American badger, long-tailed weasel, ringtail, spotted skunk, and black-tailed jackrabbit). American badger and black-tailed jackrabbit are California Species of Special Concern (CDFG 2006). Mountain lion, mule deer, and American badger are species covered by the MSCP. Ringtail and western spotted skunk have relatively few recorded occurrences within San Diego County (San Diego Natural History Museum 2006); ringtail is a fully protected furbearer in California and is considered sensitive by the Bureau of Land Management (BLM).

Additional mammal species of concern that were not investigated during this study include a number of sensitive rodent and bat species. Stephens' kangaroo rat (*Dipodomys stephensi*), a state and federally listed species, may have a potential to occur onsite. Surveys from January 2001 were negative for this species, though suitable habitat was present (ENVIRA 2001). The current status of this species onsite is unknown. The Ramona grasslands population occurs less than approximately 5 kilometers to the north. Suitable habitat is present on the Salvation Army property within areas supporting sparse annual grasslands and coastal sage scrub with deep well-drained loamy soils and gentle slopes. Additional sensitive rodent species listed by CDFG as California Species of Special Concern that may have a potential to occur onsite include Dulzura California pocket mouse (*Chaetodipus californicus femoralis*) and Pacific southern grasshopper mouse (*Onychomys torridus Ramona*). Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*) and San Diego desert woodrat (*Neotoma lepida intermedia*), also California Species of Special Concern, were

both observed during previous biological surveys of the site (Merkel and Associates 2005).

Several sensitive bat species listed as California Species of Special Concern may also occur onsite. These bats require caves, rock crevices, or abandoned buildings free from human disturbance for roost sites as well as suitable foraging habitat. The following bats are Species of Special Concern that may occur onsite in areas with rock caves and crevices or trees with exfoliating bark and hollowed branches: pallid bat (*Antrozous pallidus*), California leaf-nosed bat (*Macrotus californicus*), Townsend's big-eared bat (*Plecotus townsendii*), big free-tailed bat (*Nyctinomops macrotis*), Western mastiff bat (*Eumops perotis*), and spotted bat (*Euderma maculatum*).

Study Area: The dominant landform in the eastern part of the study area is the “West Branch” of San Vicente Creek, which flows through a wooded valley and is paralleled by Mussey Grade Road. The West Branch is a USGS blue-line stream that supports oak riparian forest and provides a perennial source of water in most years. The dominant landform in the western portion of the study area is collectively the east slopes of Iron Mountain. Through the middle of the study area lays a series of north-south trending broad plateaus and valleys, saddles, and connecting canyons.

The areas surveyed on foot within the larger study area include lands immediately adjacent to the Salvation Army property to the north and east and up to about 2 km to the south and southeast of Salvation Army property. The six survey transects were located in the following areas: 1) Golden Eagle Ranch West, 2) Mussey Grade Road (MGR) – Salvation Army turnoff, 3) MGR – Ellis Trust and Hanus Trust, 4) MGR – Foster Canyon Truck Trail, 5) Betty Meador Trust, and 6) Boulder Oaks Ranch (County Parks and Recreation).

Background and Definitions: The Salvation Army property lies within the Metro-Lakeside-Jamul Segment of the San Diego County Subarea Plan of the Multiple Species Conservation Program (MSCP). The County implements the MSCP through the San Diego County Subarea Plan and the Biological Mitigation Ordinance (BMO). Based on criteria defined in the BMO, the project site lies within a Biological Resource Core Area (BRCA). BRCA's are high quality habitats that support a variety of sensitive species and provide connecting linkages to other habitats within and outside the MSCP preserve area (County of San Diego 1997). The BMO requires that impacts to BRCA be avoided to the maximum extent practicable (County of San Diego 2004). BRCA's are among the highest priority areas for assembling MSCP preserve lands.

Although no hard-line preserve boundaries are delineated in this segment of the Subarea Plan, the definitions and consistency requirements that guide the assembly of the preserve are intended to maximize and maintain connections between core habitat areas (County of San Diego 1997, Conservation Biology Institute 2002, 2003). These linkages allow for demographic and genetic exchange by all species between inland and more coastal areas and between different watersheds. They are also intended to allow larger predators (mountain lions, coyotes, and bobcats) to move among conserved core habitat blocks and reach more coastal habitats (Conservation Biology Institute 2002). These top predators are particularly vulnerable to extirpation from fragmented habitats (Soule et al. 1992, Noss 1983), which can precipitate further changes to ecological communities (Conservation Biology Institute 2002).

"Habitat linkage" is defined for purposes of MSCP monitoring as habitat areas that provide connectivity between habitat patches as well as year-round foraging, reproduction, and dispersal habitat for resident plants and animals (County of San Diego 1995, Conservation Biology Institute 2002, 2003). The BMO defines "linkage" more generally as an area of land, which supports or contributes to the long-term movement of wildlife and genetic material (County of San Diego 2004).

The BMO defines “corridor” as a specific route that is used for movement and migration of a species. Within this context the Salvation Army property consists of BRCA, habitat linkages, and wildlife corridors. As such, the project must comply with the MSCP and BMO design standards and criteria for corridors and linkages (County of San Diego 1997, 2004).

Regional Context: Several open space preserves exist in the study area vicinity, including the Iron Mountain Preserve Area to the west, Dos Picos County Park and Mount Woodson Open Space to the north, a large MSCP Preserve (County-owned Boulder Oaks Ranch and State-owned San Vicente property) to the south, and a large MSCP preserve (State-owned Monte Vista Ranch) further to the east (Figure 2). The Salvation Army property is part of a regional habitat linkage between San Vicente Reservoir to the south; Iron Mountain, Sycamore Canyon, Beeler Canyon, and Los Penasquitos Canyon to the west; Mount Woodson, Sycamore Creek, San Pasqual Valley, and Guejito Ranch to the north; and Monte Vista Ranch, Oak Oasis Park, Silverwood Wildlife Sanctuary, El Capitan Reservoir, and Cleveland National Forest to the east. The high concentration of biological preserves, the presence of BCRA, and previous biological survey results suggest that the study area supports a high concentration of sensitive biological resources that, if lost or fragmented, could not be replaced or mitigated elsewhere (County of San Diego 1996, CDFG 1999).

The County and CDFG (1999) identified this study area, including the Salvation Army and adjacent properties, as a biological hot spot in San Diego County and have subsequently acquired several of these parcels for biological open space. Sensitive animal species observed during the present study or previous surveys compiled by CDFG (1999) within the study area are included in Table 1. A total of 43 sensitive wildlife species were observed in the study area (CDFG 1999 and present study), whereas biological studies for the Salvation Army Project only detected 10 sensitive or locally important species (Merkel and Associates 2005, Appendices 2 and 5). The low detection rate on Salvation Army is likely due to

limited survey effort rather than absence of these species given that nearly the full range of habitat types found within the larger study area is present on the Salvation Army property. Two of the 10 species, northwestern San Diego pocket mouse and San Diego desert woodrat, were not detected in previous surveys compiled by CDFG (1999) or the present study but were observed during small mammal trapping for Salvation Army (ENVIRA 2001).

Table 1. Sensitive or Locally Important Animal Species Observed Within the Study Area (Salvation Army Property and 2 km-Buffer) ¹

Species	Status²
Invertebrates	
San Diego fairy shrimp (<i>Branchinecta sandiegonensis</i>) ³	FE
Quino checkerspot butterfly (<i>Euphydryas editha quino</i>) ⁴	FE
Amphibians and Reptiles	
Western spadefoot toad (<i>Scaphiopus hammondi</i>)	CSC, Protected
Arboreal salamander (<i>Aneides lugubris</i>)	No special status
San Diego banded gecko (<i>Coleonyx variegates abbottii</i>)	SA
Silvery legless lizard (<i>Anniella pulchra pulchra</i>)	CSC
San Diego coast horned lizard (<i>Phrynosoma coronatum blainvilleii</i>)	CSC, Protected
Coastal western whiptail (<i>Cnemidophorus tigris multiscutatus</i>)	SA
Orange-throated whiptail (<i>Cnemidophorus hyperythrus beldingi</i>)	CSC, Protected
Granite night lizard (<i>Xantusia henshawi henshawi</i>)	No special status
San Diego ringneck snake (<i>Diadophis punctatus similis</i>)	SA
Coastal rosy boa (<i>Lichanura trivirgata roseofusca</i>)	SA
Coast patch-nosed snake (<i>Salvadora hexalepis virgultea</i>)	CSC
Two-striped garter snake (<i>Thamnophis hammondi</i>)	CSC
Northern red-diamond rattlesnake (<i>Crotalus ruber ruber</i>)	CSC
Birds	
Golden eagle (<i>Aquila chrysaetos</i>)	CSC, Fully Protected
White-tailed kite (<i>Elanus caeruleus</i>)	SA, Fully Protected
Osprey (<i>Pandion haliaetus</i>)	CSC
Northern harrier (<i>Circus cyaneus</i>)	CSC
Cooper's hawk (<i>Accipiter striatus</i>)	CSC
Sharp-shinned hawk (<i>Accipiter striatus</i>)	CSC
Western screech owl (<i>Otus kennicottii</i>)	CSC, Fully protected

Long-eared owl (<i>Asiootus wilsonianus</i>)	CSC
Turkey vulture (<i>Cathartes aura</i>)	No special status
California gnatcatcher (<i>Polioptila californica californica</i>)	FT, CSC
Bell's sage sparrow (<i>Amphispiza belli belli</i>)	CSC
So. Cal. rufous-crowned sparrow (<i>Aimophila ruficeps canescens</i>)	CSC
Grasshopper sparrow (<i>Ammodramus savannarum</i>)	SA
Yellow warbler (<i>Dendroica petechia</i>)	CSC
Yellow-breasted chat (<i>Icteria virens</i>)	CSC
Tricolored blackbird (<i>Agelaius tricolor</i>)	CSC
Black-crowned night heron (<i>Nycticorax nycticorax</i>)	SA
Great-blue heron (<i>Ardea herodias</i>)	SA
California horned lark (<i>Eremophila alpestris</i>)	CSC
Western bluebird (<i>Sialia mexicana</i>)	MSCP
Mammals	
Mountain lion (<i>Felis concolor</i>)	Protected, MSCP
Mule deer (<i>Odocoileus hemionus</i>)	MSCP
Bobcat (<i>Lynx rufus</i>)	No special status
Ringtail (<i>Bassariscus astutus</i>)	Protected
Western spotted skunk (<i>Spilogale gracilis</i>)	No special status
Long-tailed weasel (<i>Mustela frenata</i>)	No special status
San Diego black-tailed jackrabbit (<i>Lepus californica bennettii</i>)	CSC
Merriam's chipmunk (<i>Eutamias merriami</i>)	No special status

¹ Data are derived from previous surveys within the study area compiled by CDFG (1999) and from the present study. The study area includes the Salvation Army Property and surrounding areas within 2 kilometers. Observations from outside this study area (e.g., Monte Vista Ranch) are excluded from the table with two exceptions (see footnotes 3 and 4).

² Status: FE – Federally Endangered; FT- Federally Threatened; CSC – CDFG Species of Special Concern; Fully Protected - species that may not be taken or possessed without a permit from CDFG; SA - California Special Animals includes all taxa the CNDDDB is interested in tracking regardless of status or legal protection; MSCP – species covered by the MSCP; No special status – a few select species without special status were included because of their local biological interest or importance.

³ Observed 3 kilometers south of Salvation Army property.

⁴ Observed 2.3 kilometers south of Salvation Army property.

Suitable habitat within the historical range of the federally endangered Quino checkerspot butterfly (*Euphydryas editha quino*) is present in the openings of chaparral, coastal sage scrub, or grasslands. The Quino checkerspot was

observed in the Foster Canyon area (San Vicente preserve) approximately 3 kilometers south of the Salvation Army property (Fred Sproul, consulting biologist, personal communication).

The federally threatened San Diego fairy shrimp (*Branchinecta sandiegonensis*) was detected 2.3 kilometers south of Salvation Army property in a granite basin on a rock outcrop with seasonally ponded water (CDFG 1999 and Fred Sproul, personal communication). The federally and state endangered least Bell's vireo (*Vireo bellii pusillus*) has not been observed in the immediate study area, however, focused surveys for this species have not been conducted. Suitable habitat for least Bell's vireo occurs in the larger drainages containing dense willow stands within riparian forest habitats on the Salvation Army property.

American badger also has a potential to occur onsite as suitable grassland and open scrub habitats occur. American badger was detected in the Wildcat Canyon area (EDAW 2006) and Ramona grasslands (Ecological Ventures 2005)

Results: The survey results for focal mammal species are described below for each transect and are summarized in Figure 1. In addition to the focal mammal species, other mammal species detected included many of the common rodent species, striped skunk, and desert cottontail. Although not the primary focus, amphibians and reptiles observed during this survey included pacific tree frog, western toad, bullfrog, side-blotched lizard, western fence lizard, granite spiny lizard, western whiptail, coast horned lizard, and two-striped garter snake.

A diversity of bird species was observed and noted during the tracking surveys including American kestrel, golden eagle, white-tailed kite, Cooper's hawk, red-tailed hawk, red-shouldered hawk, merlin, turkey vulture, blue-gray gnatcatcher, western bluebird, American coot, red-winged blackbird, oak titmouse, acorn woodpecker, northern flicker, Nuttall's woodpecker, common raven, American crow, Bewick's wren, house wren, ash-throated flycatcher, black phoebe,

common phainopepla, mourning dove, bushtit, hooded oriole, common yellowthroat, spotted towhee, California towhee, lesser goldfinch, yellow-rumped warbler, California quail, western meadowlark, and Anna’s hummingbird.

Results of the track and sign surveys are summarized in Table 2 and are described below for each transect.

Table 2. Summary of track and sign survey results.

Transect	Species Present ¹	Number of Passes (Observations)	Transect Length (m)
1. Golden Eagle Ranch West	MD, BC, CO, GF, RA, JR	130	451
2. MGR-Salvation Army Turnoff	MD, BC, CO, GF, RA, SP, LT	20	478
3. Ellis Trust & Hanus Trust	MD, BC, CO, GF, LT, JR	41	418
4. MGR-Foster Truck Trail	BC, CO, GF	26	512
5. Betty Meador Trust	ML ² , MD, BC, CO, GF, JR	36	707
6. Boulder Oaks Ranch	ML ³ , MD, BC, CO, GF, RA	90	3010

¹ ML - Mountain Lion, MD - Mule Deer, BC – Bobcat, CO – Coyote, GF – Gray Fox, LT – Long-tailed Weasel, JR – Black-tailed Jackrabbit, RA – Raccoon, SP – Spotted Skunk

² 1991 observation

³ 1991 observation

Transect 1: Our first transect was on the Golden Eagle Ranch West on the north boundary of the Salvation Army property. This track and sign transect was set up and conducted in the vicinity of the pond located at N32.98981 W116.93474 (all latitude-longitude coordinates are in World Geodetic System of 1984). This sample area lies within an active wildlife corridor that includes diverse habitat and seasonal water. The pond itself lies in a valley surrounded by undeveloped hilly

terrain. This area connects via native habitats and gentle terrain to a larger pond at Dos Picos County Park to the north, and a tributary canyon to the south on Salvation Army property. The predominant habitat transitions between mixed chaparral, coastal sage scrub, grassland, and disturbed habitat (ranchland).

We found an abundance of mule deer tracks on a definite north/south travel orientation using trails on either side of the canyon that extends south from the pond crossing onto the Salvation Army property. Also found was an abundance of coyote tracks and scat, along with significant evidence of prey species including rabbits, small rodents, skunks and squirrels throughout the area. Evidence of bobcat, gray fox, raccoon, and San Diego black-tailed jackrabbit was also found.

We found this to be a healthy, active and very diverse movement corridor with a particularly high activity level for mule deer and other focal species. Six of the ten focal species were detected with a total of 130 passes (observations) recorded for the 451-meter long transect. Tracking conditions were good with moist mud left along the pond edges and well-used deer trails along the canyon sides.

Transect 2: Our second survey transect sampled the creek bed and roadside adjacent to the Salvation Army turnoff at 14488 Mussey Grade Road (along West Branch of San Vicente Creek). This survey transect starts at N32.98898 W116.92673, sampling the culvert and both sides of the road as it winds through an oak riparian habitat on the eastern boundary of the Salvation Army property.

We found evidence of gray fox, coyote, mule deer, bobcat, long-tailed weasel, spotted skunk and raccoon throughout this area with cottontails, small rodents and ground squirrels also quite apparent by their sign. The long-tailed weasel and spotted skunk tracks were found in the culvert under the road. Many birds indicative of a healthy ecosystem were noted in this area as well.

Several trails transit across the road east and west through this area with evidence of mule deer, coyote, gray fox, raccoon and squirrels crossing (some not successfully; road kill). This area supports a diversity of species with seven out of ten focal species observed and a total of 20 passes (observations) recorded for the 478-meter long transect. Tracking conditions were good within the culvert but poor for the area along the road shoulder.

Ringtail was not detected during the survey, but was observed in 1994 successfully crossing Mussey Grade Road just north of the Salvation Army turnoff (Bonnie Hendricks, consulting biologist, personal communication). Ringtail is likely to still be present in the area, as key habitat components exist including wooded areas with rocky outcrops, boulder piles, and seasonal water (Murie and Elbroch 2005, Elbroch 2003, Whitaker 1980). This species has become increasingly rare in San Diego County, but is still known from Mt. Woodson and the Wildcat Canyon area (San Diego Natural History Museum 2006, EDAW 2006).

Transect 3: The third survey was conducted further south along the eastern border of the Salvation Army property on the Ellis and Hanus holdings. Here the land follows an east/west draw that offers oak riparian habitat with good cover, forage, and plenty of prey species for carnivorous animals. The riparian draw gives way to open chaparral and then grassland that was burned in the 2003 Cedar Fire.

We found evidence of a flow of wildlife through this area following linear landscape and habitat features in an east/west and a north/south direction by coyotes, bobcat, and mule deer. We also found evidence of gray fox, long-tailed weasel, and black-tailed jackrabbit as well as an old mule deer carcass, possibly a victim of the 2003 Cedar fire. There is a well-used north/south deer run along the Salvation Army property line within the open habitats of this broad

valley/plateau. Six out of ten focal species were detected and a total of 41 passes were recorded along the 418-meter long transect. Tracking conditions ranged from poor to good along the transect length.

Transect 4: The fourth survey transect included a segment of Mussey Grade Road near Foster Truck Trail. We found evidence of coyote, bobcat, and gray fox on the west side of the road at the junction with the southern access road to Salvation Army and Wildwood Ranch. Three of the ten focal mammal species were detected and a total of 26 passes were recorded along the 512-meter long transect. Tracking conditions were poor on the shoulder of Mussey Grade Road and fair along the dirt road.

Transect 5: Next we surveyed the Betty Meador Trust property examining obvious corridor routes in both a north/south orientation along a plateau south of the Wildwood Ranch pond, and an east/west route following a creek. We found evidence of mule deer, bobcat, coyote, gray fox, and black-tailed jackrabbit throughout the area. Five of the ten focal species were observed along this transect and a total of 36 passes were recorded along the 707-meter transect. Although mountain lion sign was not observed during the one time transect survey in this area, evidence of a mountain lion prey cache was observed previously near this transect. Cougar predation of goats occurred in March of 1991 (Fred Sproul, personal communication; Figure 1).

Transect 6: The sixth survey transect included a loop on the Boulder Oaks Ranch, including the oak woodlands and meadows, the pond, and the dirt road leading north into the valley on Wildwood Ranch. Evidence of mule deer, bobcat, coyote, gray fox, raccoon, and San Diego black-tailed jackrabbit were observed. A young mule deer buck was sighted along with several deer bedding areas in the oak woodland-meadow area. Desert cottontails, California ground squirrel, and Botta's pocket gopher were very abundant. A total of six focal species were detected and 90 passes were recorded along the 3010-meter transect.

Although mountain lion sign was not observed during the one time transect survey in this area, tracks of mountain lion have been reported on the transect at the Boulder Oaks pond (spring of 1994) and in the canyon just south of the Salvation Army property (spring of 1998) (Fred Sproul, personal communication, Figure 1).

Discussion: Within the study area, the heavily wooded “West Branch” of San Vicente Creek provides cover and a natural topographic feature for wildlife movement in a north-south direction. Mussey Grade Road (MGR) runs parallel to the creek along with occasional low-density residences. There are still several stretches of the creek with no development other than the two-lane road itself. These stretches in conjunction with tributary canyons and associated ridgelines appear to provide opportunities for east-west wildlife movement. Two areas that were examined where evidence of east-west wildlife movement was found include:

- Confluence of the tributary canyon (coming from Salvation Army property) with the “West Branch” on west side of MGR; associated culvert under-crossing of MGR; and two adjacent tributary canyons (with dirt road between them) on east side of MGR (Transect 2 on Figure 1)
- Tributary canyon from Salvation Army to the “West Branch” on the Hanus, Ellis, and Bale Trust properties (Transect 3 on Figure 1)

Also within the study area is an overall north-south trending natural corridor (and habitat linkage) at the base of the Iron Mountain range comprised of several broad valleys or plateaus, and saddles between hills that connect the valleys. This area is particularly rich in wildlife and serves as both a movement corridor and valuable foraging and breeding habitat. Evidence of use of this habitat linkage by the focal wildlife species was found in our survey areas on the boundaries of the Salvation Army property. These areas include:

- Golden Eagle Ranch West pond and tributary leading south into Salvation Army on its northern boundary (Transect 1 on Figure 1)
- Hanus Trust along western boundary of Salvation Army (Transect 3 on Figure 1)
- Betty Meador Trust along southern boundary of McGuire Ranch (Transect 5 on Figure 1)
- Boulder Oaks Ranch (County Parks and Recreation) along southern boundary with Wildwood Ranch (Transect 6 on Figure 1)

Within this regional north-south habitat linkage, the valleys contain a diverse mosaic of habitats including oak woodland, grassland, coastal sage scrub, chaparral, and open water ponds. The saddle areas are generally mixed chaparral and also provide a natural movement route for wildlife. These habitat areas along the north-south habitat linkage provide important functions for wildlife such as cover, browse, and water for mule deer; stalking of prey and hiding of kill sites for mountain lion; and a safe movement route to more distance resources for both species.

This overall north-south habitat linkage can be defined as the valleys, canyons, and intervening saddles from 1) the pond at Dos Picos County Park; 2) southward to the pond at Golden Eagle Ranch West; 3) through Salvation Army via two generally north-south tributary canyons, two saddles between the tributaries and the broad plateau/valley, and the edges of the broad valley leading south to 4) the Wildwood Ranch pond (western route) and the McGuire Ranch pond (eastern route); and 4) further south across a broad plateau containing the Boulder Oaks Ranch pond and meadows (Figures 1 and 2).

Review of maps depicting the proposed project development overlaid onto the vegetation map indicates that the most structurally diverse habitats (particularly ecotonal habitats with woodland) would be disproportionately impacted by the development (BRG 2005). The habitat areas that appear to be most conducive

to north-south wildlife movement would be impacted. These areas include the ecotonal habitats along the valley/plateau in the southern two-thirds of the property and the two saddles connecting the plateau to the generally north-south trending tributary canyons (north and south of the larger east-west tributary to the West Branch). The saddle areas are comprised of mostly chaparral with topography conducive to wildlife movement between an oak riparian canyon and the long valley/plateau in a north-south direction. Wildlife will preferentially use saddles or passes between the steeper hills as travel routes (McKenzie 1995, Barry Martin, personal observation). The long plateau/valley on the property contains a mosaic of coastal sage scrub, oak woodland, chaparral, grassland, and disturbed habitats. The highest wildlife use areas and north-south travel routes are likely to be focused along the edges of this valley/plateau where sufficient cover can be found and the transition zone between habitat types and different slopes favor wildlife use.

Ecotonal areas between habitat types are known to be especially valuable to wildlife (McKenzie 1995, Barry Martin, personal observation). For example, in the Chula Vista MSCP Subarea Plan (2003) development within habitat edge areas is discouraged. During the multiple year Southern California Puma Project, edge habitats, particularly chaparral-woodland and woodland-grass, were important to male cougars at night when they were most likely hunting and traveling, and female cougars during all time periods (Sweaner, et. al. 2004). Prey caches were found in all cover types, but most frequently in woodland or chaparral-woodland (Sweaner, et. al. 2004).

The east-west travel routes would also be impacted by the development from roadway fire clearance and an increase in traffic volume on the access road along the oak riparian tributary canyon. Roads and road improvements can cause a direct loss of habitat, alter the quality of adjacent habitat, impede animal movements, and lead to road mortality (Forman, et. al. 2003). Studies suggest that the two main groups of factors that influence road-kill are 1) traffic volume

and speed, and 2) proximity of habitat cover and wildlife movement corridors (Forman, et. al. 2003). Given that the road improvements will alter habitat and increase traffic volume along a road within an active riparian wildlife corridor, the effects on wildlife populations would be significant.

The second east-west travel route via the Ellis and Hanus Trust properties would no longer be functional as it would lead into the proposed developed areas of the Salvation Army (Transect 3 on Figure 1).

The remaining undeveloped portions of the Salvation Army will still support wildlife populations, however, the core of this habitat linkage will be significantly impacted and edge effects will contribute to degradation of the surrounding habitats. The majority of land not proposed for development by Salvation Army is chaparral (85%), with relatively little habitat diversity preserved (see Figure 4-5, BRG 2005). This may contribute to a decline in habitat usage by mountain lions and other species. The Salvation Army land lies within a BCRA and habitat linkage area and proposes impacts (direct or indirect) to most of the woodland-chaparral and woodland-grass habitats onsite (Figure 4-5, BRG 2005).

Particularly vulnerable to loss or fragmentation of woodland, coastal sage scrub, and grassland communities are the special status species detected in the surrounding areas including mountain lion, long-tailed weasel, spotted skunk, black-tailed jackrabbit, and (previously detected) ringtail. The Southern California Puma Project found that cougars typically avoided chaparral habitats during night and crepuscular periods when they were most likely hunting or traveling (Sweaner, et. al. 2004). Additionally, cougars were rarely in close proximity to buildings or campgrounds. Nearly 80% of the locations recorded for radio-collared female cougars were greater than 1000 meters from buildings or campgrounds during different times of the day (Sweaner, et. al. 2004).

The two closest radio-collared mountain lions to the study area were 1) north of Ramona in the Boden Canyon and Guejito Ranch area, and 2) areas east of El Capitan Reservoir extending into the Cuyamaca Mountains (Mike Puzzo, personal communication). Mountain lion activity was also identified via track and sign surveys on the Monte Vista Ranch approximately 6 kilometers southeast of the study area (EDAW 2006). Mountain lion was detected at only one location monitored among several corridors considered critical to regional wildlife movement in the MSCP preserve (I-5/I-805 merge at western end of Los Penasquitos Canyon) (Conservation Biology Institute 2002). The distribution of known mountain lion home ranges in San Diego County points to the importance of maintaining the integrity of the north-south and east-west habitat linkages within the study area for overall regional connectivity necessary to maintain gene flow and long-term population viability for the mountain lion.

The Salvation Army project proposes direct or indirect impacts to the majority of the woodland-chaparral and woodland-grass edge habitats onsite. An area of human influence extending 1000 meters from proposed buildings or campgrounds would stretch across most of the property. Given that results from the Southern California Puma Project indicated that nearly 80% of the locations recorded for radio-collared female cougars were greater than 1000 meters from buildings or campgrounds, build-out of the proposed project facilities would be expected to have a significant impact on the movement and behavior of mountain lion.

Development of this project as proposed would contribute to fragmentation of the open space system of existing preserves surrounding the Salvation Army property. This preserve system presently encompasses approximately 3,216 hectares (7,947 acres) (i.e., 4,233 acres on Monte Vista Ranch, 1,214 acres on Boulder Oaks Ranch, 1,500 acres on San Vicente property, 40 acres on BLM, 880 acres on Iron Mountain Preserve, and 80 acres on Dos Picos Park). Protection of the onsite north-south and east-west regional habitat linkages from

fragmentation and edge effects within the larger open space system is crucial to the continued viability of wildlife populations in the region.

Conclusions: Results of the San Diego Tracking Team's surveys confirm that a healthy and diverse ecosystem in the study area supports robust mammal movement in predictable north-south and east-west orientations following topographical features. It was evident from the survey results of adjacent areas that the Salvation Army property is part of an important regional habitat linkage serving to connect several large areas of open space in all directions.

The Salvation Army land lies within a BCRA and habitat linkage area and proposes impacts (direct or indirect) to most of the woodland-chaparral and woodland-grass habitats onsite (Figure 4-5, BRG 2005).

The Salvation Army project, as currently proposed would pose a significant impact on the north-south and east-west regional habitat linkage by concentrating development in ecotonal woodland-chaparral and woodland-grass habitat areas known to be particularly valuable for wildlife (Sweanor 2004, McKenzie 1995). Wildlife will also preferentially use saddles or passes between the steeper hills as travel routes. Two of these areas (i.e., saddles providing logical north-south movement routes) are also proposed for development under the current Salvation Army project alternatives. The majority of land not proposed for development by Salvation Army is chaparral (85%), with relatively little habitat structural diversity preserved (see Figure 4-5, BRG 2005). This may also contribute to a decline in habitat usage by mountain lions and other species.

The results of this and previous biological surveys, the presence of BCRA, and the high concentration of biological preserves within the larger study area all indicate that the study area supports a high concentration of sensitive biological resources that, if lost or fragmented, could not be replaced or mitigated elsewhere (County of San Diego 1996, CDFG 1999). Protection of the onsite

north-south and east-west regional habitat linkage from fragmentation and edge effects within the larger open space system is crucial to the continued viability of wildlife populations in the region.

References:

Beier, P. and S. Loe

1992. A checklist for evaluating impacts to wildlife movement corridors. Wildlife Society Bulletin 20:434-440.

BRG Consulting, Inc.

- 2005 Draft Environmental Impact Report for the proposed Salvation Army Divisional Camp and Retreat. Prepared for County of San Diego.

California Department of Fish and Game (CDFG)

- 1999 Conceptual Area Acquisition Plan, Iron Mountain-San Vicente Preserve in San Diego County. CDFG Region 5.
2006 Special Animals. Biogeographic Data Branch, California Natural Diversity Data Base, February 2006.

County of San Diego

- 1995 Multiple Species Conservation Program (MSCP), Technical Resource Document.
1996 Multiple Species Conservation Program (MSCP) Plan, 1:2-9 – 2-11.
1997 Multiple Species Conservation Program (MSCP) County of San Diego Subarea Plan.
2004 Biological Mitigation Ordinance.

City of Chula Vista

- 2003 Multiple Species Conservation Program (MSCP), City of Chula Vista Subarea Plan.

Conservation Biology Institute

- 2003a Wildlife Corridor Monitoring Study for the Multiple Species Conservation Program. March.
2003b Review of Regional Habitat Linkage Monitoring Locations. January.
2002 Wildlife Corridor Monitoring Study for the Multiple Species Conservation Program. January.

Crooks, K.R.

- 2000 Mammalian carnivores as indicators of habitat fragmentation in southern California. *In* Keeley, J.E. (ed.), Second interface between ecology and land development in California. California Academy of Sciences, Los Angeles, CA.

Crooks, K.R. and D. Jones.

- 1999 Monitoring program for the carnivore corridor use in the Nature Reserve of Orange County. The Nature Reserve of Orange County, Santa Ana, CA.

Cybertracker Conservation

- 2006 International Track and Sign Evaluation and Certification conducted by Mark Elbroch in San Diego, CA.

Ecological Ventures

- 2005 Cummings Ranch Biological Technical Report.

EDAW, Inc.

- 2006 Wildcat Canyon Road Before and After Construction Impact Study. Prepared for County of San Diego.

Elbroch, M.

- 2003 Mammal Tracks and Sign, A Guide to North American Species. Stackpole Books, Mechanicsburg, PA.

ENVIRA

- 2001 Presence/Absence Trapping Surveys for Stephen's Kangaroo Rat, Salvation Army Mussey Grade Project, Ramona, California. Prepared for Merkel and Associates by Philippe Vergne, ENVIRA.

Forman, R.T.

- 2003 Road Ecology Science and Solutions. Island Press, Washington. pp. 481

Hendricks, B.J.

- 2006 Personal communication with Bonnie Hendricks, Consulting Biologist.

McKenzie, E.

- 1995 Important Criteria and Parameters of Wildlife Movement Corridors. A Partial Literature Review. Southern Columbia Mountains Environmental Sector of the West Kootenay CORE Table.

Merkel and Associates

- 2005 Salvation Army Divisional Camp and Retreat Biological Report.

Murie, O.J. and M. Elbroch

- 2005 A Field Guide to Animal Tracks, Third Edition, The Peterson Field Guide Series. Houghton Mifflin Company, New York.

Noss, R.F.

- 1983 A regional landscape approach to maintain diversity. Bioscience 33:700-706.

Ogden Environmental

- 1996 Biological monitoring plan for the Multiple Species Conservation Program. Prepared for City of San Diego, California Department of Fish and Game, and U.S. Fish and Wildlife Service. April.

Puzzo, M.

- 2006 Personal communication with Mike Puzzo, UC Davis Wildlife Health Center.

San Diego Natural History Museum

- 2006 San Diego County Mammal Atlas. Biodiversity Research Center of the Californias. <http://www.sdnhm.org/mammalAtlas>.

Soule M., A. Alberts, and D. Bolger.

1992. The effects of habitat fragmentation on chaparral plants and vertebrates. *Oikos* 76:39-47.

Sproul, F.T.

- 2006 Personal communication with Fred Sproul, Consulting Biologist.

Sweanor, L., K. Logan, J. Bauer, and W. Boyce

- 2004 Southern California Puma Project. Final Report for Interagency Agreement No. C0043050 (Southern California Ecosystem Health Project) Between California State Parks and The UC Davis Wildlife Health Center. University of California, Davis, CA.

Whitaker, J.O.

- 1980 The Audubon Society Field Guide to North American Mammals. Alfred A. Knopf, New York.

APPENDIX 1

MUSSEY GRADE ROAD TRANSECTS

Transect 1 Golden Eagle Ranch West (1/11/06)

Description: Special one time transects adjacent to proposed development in Mussey Grade Road area.

Directions: Coordinate access.

Checkpoints:

- 1.) **Parking Area N32.98999 W116.93448** Check parking area, margins, and game trail leading toward canyon, up to property boundary with Salvation Army. **Habitat:** Disturbed.
- 2.) **Pond N32.98981 W116.93474** Check perimeter of the pond. **Habitat:** Temporary pond, disturbed, grassland to sage scrub/chaparral.
- 3.) **N32.98968 W116.93547** Southwest of the pond go to the prominent Laurel Sumac bush growing next to the edge of a meadow that lies west of the pond. From here arc south and then east along the dam working your way back to the parking area east of the pond, check all the approaches to the dam from the south. **Habitat:** Grassland/meadow to sage scrub/chaparral.

Transect 2 Mussey Grade Road – Salvation Army Turnoff (1/11/06)

Directions: Park at Salvation Army turnoff at 14488 Mussey Grade Road. Caution! Traffic on this road is generally light however some drivers speed and it can be dangerous as you walk along the roadside.

Checkpoints:

- 1.) **N32.98898 W116.92673** Entrance to Salvation Army Resort is a wide area where you can pull off the road and park off to the side while checking the area for tracks. Check the driveway area then head for the adjacent culvert. **Habitat:** Oak Riparian. Culvert, check creek bed as it runs through the culvert under the road. **Habitat:** Tunnel/Underpass.

- 2.) **N32.98908 W116.92694** North from culvert on the west side of the road, check along the road edge. **Habitat:** Oak Riparian.

- 3.) **N32.99100 W116.92706** Turn around at the 45 mph sign, go back to the south on the east side of the road to where you parked. **Habitat:** Oak riparian.

Transect 3
Mussey Grade Road – Ellis Trust and Hanus Trust
(1/11/06)

Directions: Drive Mussey Grade Road south to Art Bale/Pearl Ellis residence driveway. Park on driveway where paved portion changes to dirt. Walk dirt road to top along Salvation Army property boundary, loop around on deer trail.

Checkpoints:

- 1.) **Ellis property dirt road N32.98198 W116.92425** Walk along dirt road upward to east. **Habitat:** Southern mixed chaparral, oak riparian in canyon below.

- 2.) **Hanus property gate/dirt road N32.98151 W116.92727** Segment 2 starts at gate/property line between Ellis and Hanus holdings. Proceed through gate up dirt road to top along Salvation Army property boundary, loop around on deer trail back to dirt pad where house burned down and end there. **Habitat:** Southern mixed chaparral, oak woodland, grassland.

Transect 4
Mussey Grade Road – Foster Truck Trail
(5/11/06)

Directions: Drive Mussey Grade Road south to Foster Truck Trail and park.

Checkpoints:

- 1.) **Along Mussey Grade Road start at first dirt road N of Foster Truck Trail N32.97405 W116.91907** **Habitat:** Oak riparian, coastal sage scrub.

- 2.) **Along Foster Truck Trail through private gate onto Betty Meador's property N32.97044 W116.91859** **Habitat:** Oak riparian, southern mixed chaparral.

Transect 5
Betty Meador Trust
(5/11/06)

Directions: Drive Mussey Grade Road south onto Foster Truck Trail, park along road near vineyard.

Checkpoints:

- 1.) **Dirt trail to east from vineyard N32.96896 W116.91784.** Follow dirt path and wander through open meadow and chaparral to property boundary with Wildwood Ranch. **Habitat:** Southern mixed chaparral, chamise chaparral, grassland
- 2.) **Boundary along edge of Wildwood Ranch.** Follow fence line and game trails to south and double back to north. North side of steep riparian canyon below Wildwood Pond **N32.96703 W116.92592.** **Habitat:** Mixed chaparral, grassland, oak woodland.

Transect 6
Boulder Oaks Ranch
(6/17/06)

Directions: Drive Mussey Grade Road south to Foster Truck Trail, start at northern boundary of Boulder Oaks Ranch on Foster Truck Trail.

Checkpoints:

- 1.) **Sleepy hollow to Boulder Oaks Meadow N32.96225 W116.92464**
Habitat: Oak woodland, wet meadow.
- 2.) **Boulder Oaks Meadow to the Pond Turnoff N32.96070 W116.92542**
Habitat: oak woodland, grassland, vernal pools, chaparral.
- 3.) **Pond Turnoff to Pond Dam N32.95882 W116.92691** **Habitat:** oak woodland, mixed chaparral.
- 4.) **Perimeter of Pond N32.96164 W116.93195** **Habitat:** Southern mixed chaparral, grassland, freshwater marsh.
- 5.) **Pond Dam to property boundary with Wildwood Ranch** **Habitat:** Southern mixed chaparral, grassland.

**6.) Boundary with Wildwood/Boulder Oaks Road through Stringer
Meadows Habitat: mixed chaparral, grassland, oak woodland.**

End at start point (full loop).