

MAMMALS of the BALDWIN HILLS

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ABSTRACT

Our assessment of the mammalian fauna of the Baldwin Hills involved several lines of investigation. Field studies included live-trapping to census rodent populations, investigation of physical evidence (scat, tracks, etc.) and visual observations. Published sources were consulted to give historical context to our investigations and to aid in the construction of our preliminary species checklist. Sources examined include published checklists of mammals found in Los Angeles County, environmental impact studies conducted by the Los Angeles County Nature Centers that were specific to the Baldwin Hills, and specimen data from several major museum collections.

Our results indicate the current mammal community of the Baldwin Hills is species-poor compared to the area's historical fauna. It is characterized by species that are generalists, able to survive amid intense human activity. This group includes a handful of remnant native rodent species, three introduced species of rodents, a native rabbit and hare, and several mesopredators. The term "mesopredator" was introduced by Soulé et al. (1988) to describe the omnivores and smaller carnivores that flourish in the absence of a top carnivore, in this case the coyote. Mesopredators of the Baldwin Hills include the native Gray Fox, feral cats and dogs, raccoons, skunks and opossums.

Recommendations for conservation include preserving remnant coastal scrub habitat and restoring degraded areas. Elimination of feral cat and dog populations is imperative and should involve a continuing removal program due to a constant influx of stray animals. Re-establishment of a viable Coyote population would mitigate the harmful effect of these and other mesopredators. Finally, the establishment of corridors connecting the Baldwin Hills to other open habitats should be pursued.

INTRODUCTION

Located in the west-central part of the Los Angeles Basin, the Baldwin Hills are surrounded by densely populated urban developments. They now constitute an isolated island of semi-degraded coastal scrub, riparian and grassland habitats. Previous studies specific to the region have documented the presence of a depauperate mammal community. Known residents include several rodent species, Black-tailed Jackrabbits and Desert Cottontails, the Striped Skunk, the Opossum and feral dogs (County of Los Angeles 1982). Historical accounts indicate a richer species composition in the area prior to urbanization. The purpose of this study is to: (a) provide an overview of the mammals known to have historically inhabited the Baldwin Hills area; (b) document which mammal species are current residents; and (c) recommend conservation steps necessary to preserve and restore native mammal populations.

METHODS

Mammals are a diverse group, occupying numerous niches and exhibiting many different life histories. This study, therefore, employed several techniques to elucidate the historical and contemporary presence of mammals in the Baldwin Hills.

To determine which species most likely occur in the study area, published checklists of mammals for the Los Angeles area (Willett 1944; McLaughlin 1959) were reviewed. This information was supplemented with data from other publications (Ingles 1965; Hall 1981; Wilson and Ruff 1999) and from museum collections. Natural history museums are an important and reliable source of historical records for species occurrence. The following museum collections provided data on their holdings of mammals captured within the Baldwin Hills or the immediate vicinity: the Natural History Museum of Los Angeles County; the Museum of Vertebrate Zoology at the University of California, Berkeley; and the Dickey Collection at the University of California, Los Angeles. The resulting checklist (Table 1) is based on the results of current field surveys and information from the aforementioned sources.

Due to lack of access to other parts of the Baldwin Hills, field studies were limited to the Kenneth Hahn State Recreation Area (hereafter KHSRA). Field studies were conducted by D. Janiger, J. Dines and I. Horovitz, mammalogists from the Natural History Museum of Los Angeles County, from March through June 2000. Studies included a survey of rodent populations using live traps in which the three dominant habitats of the Baldwin Hills (coastal scrub, riparian, and grassland) were sampled. Sherman Live-Traps, baited with rolled oats, were

set in lines of 40 – 60 traps on the following dates and locations within the KHSRA (Fig. 11): 12 March, eastern slope near La Brea; 31 March, western slope of KHSRA; 09 April, drainage adjacent to La Cienega Blvd; 10 April, drainage adjacent to La Cienega Blvd.; 18 June, western slope of KHSRA. Traps were set at dusk and checked at dawn the next day. At least one individual of each captured species was preserved as a voucher specimen and deposited in the mammal collection of the Natural History Museum of Los Angeles County. A Global Positioning System receiver was used to record precise Geographic Information System (GIS) location data at each successful trap site. Table 1 lists all mammal species trapped in our survey. The GIS data were used to generate locality points on orthophoto maps, upon which the map (Fig. 8) presented in this report is based. This locality information will also be useful in future studies relating to the Baldwin Hills.

Trapping of volant mammals (i.e., bats) was not practical, but the presence of potential roost sites, indicated by guano, was investigated. The presence of mammals the size of a rabbit or larger is easily determined by visual observation, scat and other signs. No attempt was made to trap animals of this size. Similarly, evidence of currently active fossorial animals is obvious; no trapping was necessary to record their presence. Visual observations of mammals killed by traffic on major streets passing through the Baldwin Hills were noted and included in our survey. The Los Angeles County Department of Animal Care and Control disposes of and maintains records of animal carcasses killed by traffic. Records of large mammals killed in the vicinity of the Baldwin Hills from 1997 to 2000 were also used to generate the species list.

HISTORICAL INFORMATION

Prior to urbanization, the Los Angeles Basin comprised a diverse assemblage of habitats, including grasslands, coastal scrub, fresh water and tidal wetlands, woodland stands and riparian zones. The mammalian fauna of this time could be characterized as abundant and diverse. The Gabrielino Indians inhabited the basin from at least 500 A.D. (McCawley 1996) and, like other native groups, were adept at utilizing all of the natural resources around them. Mammals would have been an important source of food and clothing. Gabrielino use of deer, coyotes, squirrels, badgers, rodents and bear was described by Hugo Reid in 1852 (Heizer 1968). The Chumash, another native people, lived north of present-day Los Angeles in Ventura and Santa Barbara Counties), but many of the areas they inhabited were similar in environment to those occupied by the Gabrielinos. The land mammals they used, as identified from archeological remains, included deer, antelope, coyote, fox, skunk, badger, brush rabbit, jackrabbit, ground squirrel, wood rat, meadow mouse, pocket gopher, kangaroo rat and pocket mouse (Landberg 1965). Studying the resources utilized by these cultures gives us significant insight into the species that

inhabited the area before European colonization. Unfortunately, no zooarcheological sites within the Baldwin Hills appear to be known.

The founding of the Spanish Missions and the successive Mexican and American ownership of California precipitated many changes to the ecology of the Los Angeles basin. The establishment of ranchos and the growth of the city dramatically altered the landscape, and hence, the species composition. The effects of cattle and sheep grazing had a significant impact on the habitat. Furthermore, the extirpation of large carnivores to protect domestic stock altered the structure of the ecological communities.

George Willett, one of the first curators of birds and mammals at the Natural History Museum of Los Angeles County, described the hills and mesas of pre-developed Los Angeles as teeming with "a dense population of ground squirrels, kangaroo rats, wood rats, pocket mice, deer mice, harvest mice and other small mammals" (1941). These species, in turn, supported coyotes, foxes, bobcats and mountain lions. Even at that early date, it was recognized that the growth of the city was irreversibly altering the ecological landscape. Open fields were being transformed into subdivisions; streams and ponds began to dry up; and native vegetation began to disappear. Willett recalled that up until the 1880s, the Los Angeles basin was a "wide expanse of open country, stretching almost uninterruptedly from the mountains to the sea...cut by numerous streams and dotted with ponds and lagoons." By the 1950s most of this habitat had disappeared. The only thing that preserved the Baldwin Hills from this fate was the value of the oil beneath them. Nevertheless, it is a highly disturbed area, and only fragmentary patches of native habitat remain.

CURRENT MAMMAL FAUNA

Table 1 is a checklist of mammal species that are confirmed or suspected to currently inhabit the Baldwin Hills. Species known or expected to be locally extinct are not included on the list, but are discussed in the species accounts that follow.

The current species composition of the Baldwin Hills represents a depauperate community compared to the mammals known to have existed in the region prior to the late 1800s. The surviving native species are generalists which tend to be very adaptable to the environmental changes induced by human activity. Ecological specialists are more sensitive to these ecological changes and have vanished from the area. There are also several introduced mammal species that have taken up residence in the Baldwin Hills. These are species that are commensal with man: e.g. feral cats and dogs, and Old World rodents. Again, they are generalists, but these species are pre-adapted to human modification of the environment.

Table 1. Checklist of the Mammals of the Baldwin Hills. Scientific names according to Wilson and Reeder (1993). Common names according to Hall (1981).

<u>Scientific Name</u>	<u>Common Name</u>	<u>Status</u>
<i>Didelphis virginiana</i> *	Virginia Opossum	BC
<i>Antrozous pallidus</i>	Pallid Bat	D
<i>Eptesicus fuscus</i>	Big Brown Bat	D
<i>Myotis yumanensis</i>	Yuma Myotis	D
<i>Myotis evotis</i>	Long-eared Myotis	D
<i>Myotis californicus</i>	California Myotis	D
<i>Eumops perotis</i>	Western Mastiff Bat	D
<i>Pipistrellus hesperus</i>	Western Pipistrelle	D
<i>Tadarida brasiliensis</i>	Mexican Free-tailed Bat	D
<i>Canis latrans</i>	Coyote	CD
<i>Canis familiaris</i> *	Domestic Dog	B
<i>Urocyon cinereoargenteus</i>	Gray Fox	BC
<i>Felis silvestris</i> *	Domestic Cat	B
<i>Mephitis mephitis</i>	Striped Skunk	CD
<i>Spilogale putorius</i>	Western Spotted Skunk	CD
<i>Procyon lotor</i>	Raccoon	B
<i>Sciurus niger</i> *	Eastern Fox Squirrel	B
<i>Spermophilus beecheyi</i>	California Ground Squirrel	CD
<i>Thomomys bottae</i>	Botta's Pocket Gopher	BC
<i>Microtus californicus</i>	California Vole	BC
<i>Mus musculus</i> *	House Mouse	A
<i>Rattus norvegicus</i> *	Norway Rat	D
<i>R. rattus</i> *	Black Rat	D
<i>Neotoma lepida</i>	Desert Woodrat	AC
<i>Peromyscus maniculatus</i>	Deer Mouse	A
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	AC
<i>Sylvilagus audubonii</i>	Desert Cottontail	B
<i>Lepus californicus</i>	Black-tailed Jackrabbit	B

* Indicates introduced species

A = Trapped in current study.

B = Presence during current study indicated by scat, tracks, runways, or sightings of live or roadkilled animals.

C = Species represented in the LACM mammal collection originating from the Baldwin Hills.

D = Species not encountered in the current study, but expected to occur in areas with suitable habitat.

SPECIES ACCOUNTS

Virginia Opossum (*Didelphis virginiana*). Introduced into California in the early 1900s (Grinnell et al. 1937). Several individuals kept as exotic pets escaped (probably simultaneously in Los Angeles and San Jose) and rapidly colonized much of the state. The opossum is nocturnal, omnivorous and common in urban areas (Ingles 1965). In fact, the opossum does not seem to thrive very far away from human habitation (Vaughn 1954). Though semi-arboreal in their native habitat of deciduous forest, these generalists have adapted well to city life. They are commonly seen walking across power lines and fences, but are frequently killed by traffic as they attempt to cross city streets. Several specimens of *Didelphis virginiana* from the Baldwin Hills are in the mammal collection of the Natural History Museum of Los Angeles County and they are the most common non-domestic mammal killed by road traffic in the Baldwin Hills area (County of Los Angeles Department of Animal Care and Control, pers. comm.).

Bats (order Chiroptera). The only true flying mammals; this aspect of their life history made it difficult to confirm their presence in the study area. The local species are nocturnal and mostly feed upon airborne insects. In general, these bats will roost in rock crevices, tree hollows, old buildings and other man-made structures like sewer drains, culverts and highway underpasses. No bats were observed during our surveys, but several species are likely to occur here, even if only seasonally. These include various **myotis bats** (*Myotis spp.*), the **Big Brown Bat** (*Eptesicus fuscus*), the **Pallid Bat** (*Antrozous pallidus*), the **Mexican Free-tailed Bat** (*Tadarida brasiliensis*), the **Western Pipistrelle** (*Pipistrellus hesperus*) and the **Western Mastiff Bat** (*Eumops perotis*). Based on museum collection data, all of these species are known to occur in the Los Angeles area. Ecological requirements of bats include the presence of potential roost sites and a source of food and water. Both features are present in the Baldwin Hills, suggesting that at least some bat species would find the area habitable. The Big Brown Bat, in particular, is common in urban areas and can be observed hunting along tree-lined streets and near street lights where aerial insects are abundant.

Coyote (*Canis latrans*). Although not confirmed in our study, reports from personnel at KHSRA suggest that this species may still inhabit the area. When present, the coyote is the dominant carnivore in the coastal scrub community. Their absence causes an explosion in the population of mesopredators—smaller omnivores and carnivores like raccoons, skunks, opossums, foxes and feral cats (Soulé et al. 1988). The explosion, or release, of mesopredator populations has been implicated in the extirpation of many vertebrate residents of the coastal scrub community. In spite of their beneficial presence, coyotes are not well tolerated in close proximity to urban areas due to their reputation for entering residential neighborhoods and attacking domestic pets (cats and small dogs) and (very rarely) small children.

Gray Fox (*Urocyon cinereoargenteus*). The canid family is represented by at least one native species in the Baldwin Hills. Many Gray Fox specimens are found in the museum collections. Los Angeles County Department of Animal Care and Control records show two Gray Foxes were killed by road traffic in the Baldwin Hills in the last three years. Additionally, abundant tracks and scats of the Gray Fox were observed during our study, confirming the species is still present in significant numbers. It mostly preys upon rabbits, rodents and arthropods, but also opportunistically feeds on berries and other vegetation.

Red Fox (*Vulpes vulpes*). An anecdotal report of the presence of this species in the Baldwin Hills was presented in a previous study (County of Los Angeles 1982). The current study could not find evidence to support this report. The Red Fox is known to have occurred in the fields and marshes around the Ballona Wetlands, however, and may have been an occasional visitor to the Baldwin Hills via the Ballona Creek corridor. The apparently successful efforts to eliminate this non-native predator from Ballona Wetlands make its occurrence in the Baldwin Hills unlikely.

Feral Dog (*Canis familiaris*). Feral dog packs were frequently sighted during the course of this study. It is suspected that these animals were responsible for disturbing our traps, interfering with trap success. Stray dogs and cats pose a significant conservation problem. They not only have a direct impact on prey species, but also compete with native predators for resources. Even if eliminated, a constant influx of strays will quickly repopulate the park and surrounding areas. Thus, an ongoing control program would be necessary.

Feral Cat (*Felis silvestris*). Feral cats were often observed in the KHSRA and were also suspected of disturbing our small mammal traps. Like stray dogs, populations of feral cats also pose a significant conservation problem for many native animals. We noted cat feeding stations set up within KHSRA during winter 2000-2001; such food subsidies, no matter how well-intentioned, serve to exacerbate the feral cat problem.

Long-tailed Weasel (*Mustela frenata*). Based on museum records, the weasel inhabited the Baldwin Hills and surrounding areas prior to the massive urban development that occurred in the 1940-1950s. We found no evidence that *M. frenata* still inhabits the study area. A lack of sufficient habitat makes it likely that this species has been extirpated from the area.

Striped Skunk (*Mephitis mephitis*). An omnivorous species that has adapted to food subsidies provided by residential areas. Their diet includes small mammals, birds, carrion, insects and a small amount of vegetative matter. They are mostly active at night and, of course, are best known for their anal scent glands. This species was not encountered in the course of our field study, but the Natural History Museum has several specimens of this species has been

captured in the Baldwin Hills during the mid-1940s, and it is likely that it still occurs.

Western Spotted Skunk (*Spilogale putorius*). Diet and behavior is similar to Striped Skunk. This species was not encountered in the course of our field study, but specimens from the Baldwin Hills are represented in the Natural History Museum collection since the mid 1940s, and this species is also likely to still occur.

Raccoon (*Procyon lotor*). A quintessential generalist, this species occupies a wide variety of habitats and has a very catholic diet. Fruits, nuts and plants are a large part of this nocturnal mammal's nutritional regime, which also includes crayfish, small vertebrates and insects. When found in close proximity to humans, however, these mammals obtain a large part of their diet from garbage cans and from food left outside for pets. Within their range, Raccoon presence is limited by the availability of water (Kaufman 1982). There are no museum records of the Raccoon in the Baldwin Hills, but two roadkilled individuals were noted during our field surveys and one was reported in the records of the LA County Department of Animal Care and Control.

Eastern Fox Squirrel (*Sciurus niger*). This eastern North American species was introduced into the western states and is now ubiquitous in city parks and campuses. It prefers open, park-like habitats where trees are scattered and the understory is open (Flyger 1999). This species is most prominent in the parts of Kenneth Hahn State Recreation Area that have been developed as grassy recreation areas, where it can be seen gathering food throughout the day.

California Ground Squirrel (*Spermophilus beecheyi*). This species is found in successional habitats such as roadsides, chaparral openings, and grassy areas. Although a native species, its abundance is positively affected to some degree by the degrading effects of human activity. Ground squirrels prefer open areas that offer unobstructed outlooks; they are often seen atop fence posts and large rocks watching for predators. The Natural History Museum has several Baldwin Hills specimens of *S. beecheyi* in its collections. However, none were observed during field work for the present study.

Botta's Pocket Gopher (*Thomomys bottae*). Another native rodent that benefits from the effects of man. These fossorial mammals need friable soil to dig their burrows and thus are most common near roads, trails and other areas where the substrate is disturbed. Pocket gophers are the bane of urban gardeners and considered by many to be a pest species. The Natural History Museum's mammal collection has many pocket gophers collected from the Baldwin Hills and the immediate vicinity. Furthermore, several active burrow systems were observed by project biologists in the course of their field work.

Heteromyid rodents like the **Agile Kangaroo Rat** (*Dipodomys agilis*) and one species each of **Pocket Mouse** in the genera *Perognathus* and *Chaetodipus* are likely to have historically inhabited the Baldwin Hills. No representatives of this group were found in this or previous studies, but Baldwin Hills fall within the current range of these taxa (Hall 1981) and the habitat is appropriate. In addition, museum records indicate these species previously occurred in areas adjacent to the Baldwin Hills. The patchiness and disturbed nature of the remaining habitat probably precludes their survival at this time, but future habitat restoration may facilitate their reintroduction.

California Vole (*Microtus californicus*). Although not trapped in our rodent survey, a number of vole runways were identified. Runways are tunnels of trampled and cut vegetation that run through tall, uncut grass. Our method of trapping was skewed against capturing this species as rolled oats were used as bait. The California Vole prefers tender leaves and developing seeds as a food source so would not have been attracted to our traps. At least one specimen of this native rodent was trapped in the 1975 and 1977 biotic surveys conducted by biologists from the Los Angeles County Nature Centers (County of Los Angeles 1982). Additionally, several specimens of *M. californicus* taken from the Baldwin Hills in the 1950s are at the Natural History Museum of Los Angeles County.

Desert Woodrat (*Neotoma lepida*). This rodent was the most commonly captured mammal in this study. The Natural History Museum has numerous individuals of this species from the Baldwin Hills, collected from the 1930s to the 1970s. This woodrat is closely associated with rocky areas and with the prickly pear cactus, *Opuntia*, which occurs in patches on many south-facing slopes in the Baldwin Hills. It constructs a nest out of sticks, twigs, rocks and various debris it encounters in its nightly foraging. Another species, **the Dusky-footed Woodrat** (*N. fuscipes*) is frequently sympatric with *N. lepida* in coastal scrub (M'Closkey 1973). Although we found no evidence of its current or historical occurrence, *N. fuscipes* probably occurred in parts of the Baldwin Hills prior to habitat degradation. *N. lepida* is a habitat generalist compared to *N. fuscipes* (Meserve 1974), and may be better adapted for survival in the patchy habitat that remains.

Deer Mouse (*Peromyscus maniculatus*). This species is the most abundant and widespread rodent in North America and was the second most-captured species in this survey. Oddly, we did not locate any previous museum specimens that were specifically collected in the Baldwin Hills. The deer mouse diet consists primarily of seeds, but it is an opportunistic feeder and will eat insect larvae and fruit, among other things. The ubiquity of the Deer Mouse makes it an important prey item to foxes, coyotes and raptors (Ingles 1965).

Western Harvest Mouse (*Reithrodontomys megalotis*). Another small native mouse, this species was captured during our trapping efforts. The Natural History Museum has only two previous harvest mouse specimens from the

Baldwin Hills, both collected in 1957. It is an opportunistic feeder, eating a variety of seeds, herbaceous vegetation and insects. *R. megalotis* constructs small, globular nests of fibrous plant material that are often suspended in vegetation just above the ground. The single harvest mouse specimen captured in our study was found in a grassy area adjacent to coastal scrub. A previous survey (County of Los Angeles 1982) found *R. megalotis* to be the most abundant rodent in the Baldwin Hills.

House Mouse (*Mus musculus*). This introduced Old World rodent species is expected to occur in the Baldwin Hills as it is closely associated with man and ubiquitous in urban areas. It is omnivorous, but feeds more readily on grains. One was trapped during our study. There are no museum holdings of this species from the Baldwin Hills prior to the current study.

Black Rat (*Rattus rattus*). An Old World rodent with an omnivorous diet that is often associated with urban environments. This species was not encountered in the Baldwin Hills but is likely to occur there. There are no museum holdings of this species from the specific study area.

Norway Rat (*Rattus norvegicus*). Another Old World rodent often associated with urban environments. This species was not encountered in the Baldwin Hills during our surveys but is likely to occur there. We were unable to locate any museum holdings of this species from the study area.

Desert Cottontail (*Sylvilagus audubonii*). This species is mostly active in the early morning and evening, grazing upon a variety of grasses and shrubs. *S. audubonii* is not represented in museum collections, but was frequently observed in our study (including one road-kill) and in the biotic surveys conducted in 1975 and 1977 (County of Los Angeles 1982); this species is most common in low, thick brush (Vaughn 1954).

Black-tailed Jackrabbit (*Lepus californicus*). This species is primarily nocturnal, eats a variety of plant matter and is coprophagous (reingests its fecal pellets). *L. californicus* seems to prefer semi-open, thin stands of sagebrush. It was not encountered in previous surveys and is not represented in museum collections. One road-killed individual was observed during the present study near Stocker and Fairfax (D.S. Janiger).

ENDANGERED, THREATENED, AND SENSITIVE SPECIES

No mammal species listed as endangered or threatened (California Department of Fish and Game 2000) were encountered in the Baldwin Hills. Very little is known about the state's bat populations, however, and the California Department of Fish and Game considers the Pallid Bat, and the Western Mastiff Bat to be "Species of Special Concern." This term indicates that populations of

those species are suspected to be declining or highly localized and require active management to prevent them from becoming endangered or threatened.

BIOLOGICAL CONNECTIVITY BETWEEN THE BALDWIN HILLS AND OTHER REGIONAL NATURAL HABITATS

The Gray Fox and the Coyote (if still extant) are the most vagile of the native mammal inhabitants of the Baldwin Hills. These species could feasibly use Ballona Creek as a corridor to other wild areas such as the Ballona Wetlands and the Westchester Bluffs. The small home range of the other native terrestrial mammals precludes their use of this concrete-lined flood control channel as a dispersal corridor. The establishment of a suitable corridor—perhaps a wide strip of coastal scrub habitat along the Ballona Creek—may increase the likelihood of such dispersal. The feasibility of such a corridor merits further investigation.

CONSERVATION AND RESTORATION RECOMMENDATIONS

Preservation of the relatively intact sections of coastal scrub and the restoration of other more degraded tracts are recommended as the first steps in attempts to assure faunal survivability. Once these preliminary actions are in place, the possibility of a reintroduction program for selected mammal species could be entertained. However, because both feral cats and dogs pose a significant threat to native populations of rodents and other small mammals, conservation and restoration efforts should include the removal of these mesopredators. Because these populations may be regulating the numbers of introduced Old World rodent species (*Mus* and *Rattus*), the removal of feral cats and dogs may allow introduced rodent populations to increase, precipitating another conservation (and public health) problem. A successful restoration program would likely involve continuing investigation and adaptive management.

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Mammal Trapping Locations

