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memorandum

date	February 16, 2023
to	Rosanne Humphrey, City of Carlsbad
cc	Terah Donovan, Environmental Science Associates
from	Adrienne Lee, Environmental Science Associates Karla Alcaraz, Environmental Science Associates
subject	City of Carlsbad Village H Wildlife Movement Study Summary

This memorandum summarizes wildlife movement monitoring studies conducted at Village H from June 28, 2019, to December 13, 2022, capturing changes in allowable uses from specific events such as the trail opening to the public on August 1, 2019, and trail closure during the COVID-19 pandemic from March 23, 2020, to May 4, 2020. Wildlife movement monitoring studies included remote wildlife cameras, roadkill monitoring along streets bordering Village H, and dog waste studies.

Introduction

An undeveloped property known as "Village H" was acquired by the City of Carlsbad (city) as part of a 2013 legal settlement. The property was deeded to the city by Presidio Cornerstone QC, LLC, and was formally accepted by Carlsbad City Council in January 2019. The property is bisected by Carlsbad Village Drive, which divides the property into a 36.1-acre area to the north and a 24.8-acre area to the south. The northern area is an existing hardline within the Carlsbad Habitat Management Plan (HMP) preserve, set aside and protected in perpetuity by a conservation easement in 2006. It is under long-term management by the Center for Natural Lands Management. The 23.9-acre southern section of Village H consists of a 2.8-acre recreational vehicle storage area, 11.1 acres of undeveloped open space (including an area previously designated for a community facility), and two HMP hardline preserve areas (a 4.2-acre area to the southwest and a 4.4-acre area to the southeast, **Figure 1, Study Area Location**; see figures at the end of this memorandum). For the purpose of this memorandum, *study area* refers to southern section of Village H.

The Village H area is part of an important wildlife movement linkage (Link B) between core habitat areas (Core #2 and Core #4) identified during the planning phase of the HMP (City of Carlsbad 2004). Village H was identified as an important wildlife movement corridor (M1) in a citywide wildlife movement study conducted in 2015 (City of Carlsbad et al. 2015). The corridor connects the Buena Vista Creek Ecological Reserve southward through Robertson Ranch West to Agua Hedionda Lagoon, and potentially eastward to Robertson Ranch East and the Carlsbad Highlands Ecological Reserve/Lake Calavera area, as shown in **Figure 2, Carlsbad HMP Linkages**. Four "pinchpoints" were identified in the immediate vicinity of Village H (ESA 2019) (**Figure 3,**

Pinchpoints and Potential Wildlife Movement Corridors). Pinchpoints are areas where animal movement becomes funneled into specific locations within linkages due to the lack of alternative movement routes. Channels and natural drainages function as natural wildlife corridors, but when these areas intersect with roadways, with or without underpasses and culverts, movement along these areas enters a pinchpoint. Pinchpoint M1-1 has a small (2-foot-wide) culvert underneath the road, from the north side of Carlsbad Village Drive. The culvert does not go directly south into the Village H property, resulting in an at-grade crossing. M1-2 to the east has a large (12- to 15-foot-wide) culvert under Tamarack Avenue, which was gated on both sides at the time of this study, resulting in an at-grade crossing. M1-3, further east, is an at-grade crossing over Glasgow Drive. M1-4, south of Village H, has a 4-foot-wide culvert under Tamarack Avenue connecting a small drainage area south to Robertson Ranch Preserve. An additional (3-foot-wide) culvert (not identified as a pinchpoint in the 2015 wildlife movement study) is located under Pontiac Drive, just east of M1-4.

When the study area was privately owned, it was used by local residents with off-leash dogs. When the city took ownership of the property, the historic on-site trail was formalized and opened to the public on August 1, 2019. Off-leash dog use was no longer allowed because the city does not allow off-leash dogs on city trails or within HMP hardline areas, as HMP hardline areas are managed for habitat and native wildlife. Several residents expressed a desire to continue to use this area for off-leash dogs. The presence of humans and domestic dogs deters wildlife and shifts their distribution to avoid human activity (Frid and Dill 2002). Wildlife adjust their time of use to be more active in the night to avoid human daytime activities (Gaynoret al. 2018). This can interfere with their ability to forage and breed.

The purpose of wildlife movement monitoring studies at Village H was to (1) collect quantitative data on wildlife presence, humans, and domestic dogs on Village H, (2) determine if wildlife are being killed on the road while moving into or out of the site, (3) qualitatively evaluate wildlife movement patterns, and (4) assess the amount and location of dog waste left on-site, which can deter wildlife from using the site, and (5) assess the amount of dog waste left off trail as a proxy for off-leash dog use within Village H. This information will help the city evaluate the current use by wildlife and changes in wildlife behavior potentially caused by changes in the allowable uses of the Village H site.

Data collection spanned from June 28, 2019, to December 13, 2022, capturing changes in allowable uses from specific events such as the trail opening to the public on August 1, 2019, and trail closure during the COVID-19 pandemic from March 23, 2020, to May 4, 2020. Memorandums discussing the trail opening to the public and the trail closure during the COVID-19 pandemic and their effects on wildlife movement within Village H were previously prepared for the City of Carlsbad (ESA 2019, 2020). The purpose of this memorandum is to present all wildlife movement studies conducted on Village H to date, summarize trends detected, and provide management recommendations.

Methodology

Remote Wildlife Cameras

A total of 22 remote wildlife cameras were installed at Village H over the course of the study period to monitor the diversity of wildlife species using the site and determine potential wildlife movement patterns. The first wildlife camera was installed on June 25, 2019, and the last wildlife camera was removed on November 17, 2022. The duration of monitoring for each wildlife camera varied as some cameras were vandalized or stolen and some

camera locations did not detect wildlife and were moved to new locations. Specific data on the location and duration of monitoring at each remote wildlife camera are provided in **Table 1** and locations are depicted in **Figure 4, Remote Wildlife Camera Locations**. Target species for this study were coyotes and bobcats. These are wider-ranging species than smaller mammals. Movement of these species on a broad scale could help the city evaluate the wildlife movement functionality of the preserve system.

TABLE 1
REMOTE WILDLIFE CAMERA LOCATIONS

Camera	Deployment Date	Monitoring Duration	Location
VH1	6/25/2019–11/8/2019	136 days	Lat: 33.16580357° Long: -117.30507829°
VH2	6/25/2019–8/10/2019	42 days	Lat: 33.16459953° Long: -117.30472425°
VH3	6/25/2019–8/10/2019	44 days	Lat: 33.16199145° Long: -117.30468584°
VH4	6/25/2019–8/10/2019	11 days	Lat: 33.16354744° Long: -117.30476386°
VH5a	6/25/2019–12/19/19	177 days	Lat: 33.16635432° Long: -117.30534393°
VH5b	6/30/21–11/17/2022	505 days	Lat: 33.163276° Long: -117.303591°
VH6	6/25/2019–10/2/2019	99 days	Lat: 33.16466320° Long: -117.30068579°
VH7	6/25/2019–12/13/2019	174 days	Lat: 33.16436649° Long: -117.30207108°
VH8a	6/25/2019–11/8/2019	136 days	Lat: 33.15654051° Long: -117.30705798°
VH8b	11/8/2019–7/3/2020	62 days	Lat: 33.156719° Long: -117.306682°
VH9	7/25/2019–11/8/2019	106 days	Lat: 33.166116° Long: -117.304649°
VH10	7/25/2019–8/10/2019	14 days	Lat: 33.164600° Long: -117.304724°
VH11	8/23/2019–8/28/2019	5 days	Lat: 33.161924° Long: -117.304864°
VH12	8/23/2019–8/28/2019	5 days	Lat: 33.161811° Long: -117.304715°
VH13	9/12/2019–12/19/2019	98 days	Lat: 33.165786° Long: -117.304340°
VH14	9/12/2019–10/2/2019	20 days	Lat: 33.1564289° Long: -117.304627°
VH15	9/19/2019–1/17/2020	112 days	Lat: 33.164716° Long: -117.300571°
VH16	9/19/2019–1/17/2020	112 days	Lat: 33.164437° Long: -117.300078°
VH17a	11/8/2019–4/30/2020	112 days	Lat: 33.161395° Long: -117.303399°
VH17b	5/28/2021–11/17/2022	538 days	Lat: 33.161395° Long: -117.303399°
VH18	12/13/2019–5/21/2020	49 days	Lat: 33.165401° Long: -117.305199°
VH19	12/13/2019–12/30/2019	16 days	Lat: 33.165195° Long: -117.304995°
VH20	12/13/2019–7/3/2020	49 days	Lat: 33.165137° Long: -117.304918°
VH21a	11/8/2019–12/13/2019	34 days	Lat: 33.164612° Long: -117.304370°
VH21b	7/9/2020–1/6/2021	181 days	Lat: 33.163550° Long: -117.304069°
VH21c	1/6/2021–11/17/2022	680 days	Lat: 33.163240° Long: -117.303070°

All cameras were positioned approximately 1 to 3 feet off the ground to best record all potential wildlife species and signs of movement on and off the property. Cameras were set to have “low sensitivity” to movement such that anything from a small bird to a large coyote would likely trigger the cameras to start taking videos or photographs, but vegetation moving in the wind would not. To prevent vandalism and theft, each camera was locked inside specialized security boxes and the words “City of Carlsbad” and “wildlife movement study” were written on the boxes to further deter theft and inform the public. Wildlife cameras were either bolted to 4-foot-tall

steel posts dug into the ground, cabled to a chain-link fence and angled toward a culvert, or cabled onto a tree. The cameras were oriented away from the sun (to the extent practical) to protect the lens from over-exposure and positioned to capture videos or photographs of wildlife walking along a trail, headed either toward or away from the wildlife camera.

Once installed, all wildlife cameras were turned on to record and capture videos or photographs continuously (24 hours), once triggered. Each motion trigger would result in one photograph or a 10-second video. Unique camera detections were defined as a photograph or video triggered at least 30 minutes apart. The wildlife cameras within the study area were checked at least once a week by city staff and then reduced to once a month by Environmental Science Associates (ESA) staff to confirm that each camera was still in place and in working order and memory cards and batteries were switched out as necessary. Videos and photographs were then reviewed and categorized based on the species detected. Videos and photographs of human activity and/or dogs were categorized as well to make general assumptions regarding the amount of human and/or dog traffic within the study area. Wildlife camera data from June 25, 2019, to November 17, 2022, were analyzed; a summary of the results can be found in **Attachment A**.

Roadkill Monitoring

Roadkill was studied to determine if animals were being hit by cars while traveling over a road to enter or leave the site. To ensure all four pinchpoints were monitored, portions of Tamarack Avenue, Carlsbad Village Drive, and Glasgow Avenue that border Village H were included in the study area (**Figure 5, Roadkill Monitoring Results**). Roadkill monitoring began July 25, 2019, and ended on July 25, 2020, with a minimum of three surveys completed per week. For the full list of survey dates, see **Attachment B**.

ESA biologists, volunteers, and a city staff member conducted the monitoring. The survey area was monitored by walking or driving the roadkill monitoring survey area slowly and scanning the entire roadway for roadkill. If something was not identifiable from the car, the surveyor wore a safety vest and walked the survey area using binoculars to scan the road. If roadkill was detected, the surveyor would take a photo when road conditions were safe and upload the photo onto the citizen scientist mobile application iNaturalist[1] to create an “observation” within the University of California, Davis California Roadkill Observation System (CROS) Project (iNaturalist 2022). Once the observation was recorded, the surveyor called the city’s Public Works department for animal disposal pickup.

Dog Waste Study

The purpose of this study was to determine how much dog waste is being left behind each week (number and weight) and where (e.g., native habitat, on or near the trail). Dog waste stations were installed as part of the trail improvements, so this study captures dog waste left by dog owners along a leash-only trail and surrounding area that is off-limits to dogs. Surveyors walked meandering transects throughout the Village H site (western parcel only) in areas that were open enough to walk through. When dog waste, coyote scat, or tennis balls (i.e., dog toys) were encountered, these locations were recorded using the ArcGIS Collector (Collector app) mobile application. Dog waste, coyote scat, tennis balls, and any litter found were then collected to be thrown away at the end of each

1 iNaturalist. Available from https://www.inaturalist.org.

survey. Collected dog waste was weighed at the end of each collection period. Coyote scat was distinguished from dog waste by the presence of berries, animal bones, and/or large amounts of fur.

Surveys were conducted approximately every other week from August 28, 2019, to October 23, 2019, and then reduced to once a month in response to the COVID-19 pandemic, through December 13, 2022. Note that the initial survey on August 28, 2019, includes all previously uncollected waste from the site; therefore, only subsequent collections were used to determine weekly and monthly coyote scat and waste left by dog owners.

Results

Remote Wildlife Cameras

The wildlife cameras captured data spanning a period of 844 days. Species detected at the 22 wildlife camera locations included coyote (*Canis latrans*), bobcat (*Lynx rufus*), skunk (*Mephitis mephitis*), rabbit (*Sylvilagus spp.*), California ground squirrel (*Otospermophilus beecheyi*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), various bird species, various rodent species, off-leash dogs, on-leash dogs, and humans. The most common wildlife species detected at Village H were coyotes, small mammals (rodents/rabbits/raccoons), and birds. Based on wildlife camera data, updated presumed wildlife movement patterns within Village H are depicted in **Figure 6, Updated Wildlife Movement Corridors**. Representative photographs of wildlife species detected are included in **Attachment C**.

Roadkill Monitoring

A total of 15 roadkill occurrences were detected during the 129 survey dates from July 25, 2019, to July 25, 2020. All roadkill observations ranged from birds to small mammals. All roadkill observations and their associated survey dates and surveyor information are listed in **Table 2**, and locations of all roadkill observations are displayed in Figure 5.

TABLE 2
VILLAGE H ROADKILL DETECTIONS

Date	Surveyor	Species
8/28/2019	A. Sullivan	Opossum
9/19/2019	H. Swarthout	Opossum
10/23/2019	A. Sullivan	Rabbit
12/5/2019	A. Sullivan	Rabbit and Bird
12/13/2019	H. Swarthout	Hawk
12/15/2019	K. Merrill	Barn Owl
12/18/2019	A. Lee	Barn Owl
12/26/2019	A. Sullivan	Skunk
12/27/2019	H. Swarthout	Rabbit
12/31/2019	A. Sullivan	Bird
1/24/2020	H. Swarthout	Hawk
2/9/2020	K. Merrill	California Quail
3/8/2020	K. Merrill	Rabbit
3/12/2020	H. Swarthout	Squirrel
7/25/2020	K. Merrill	Rabbit

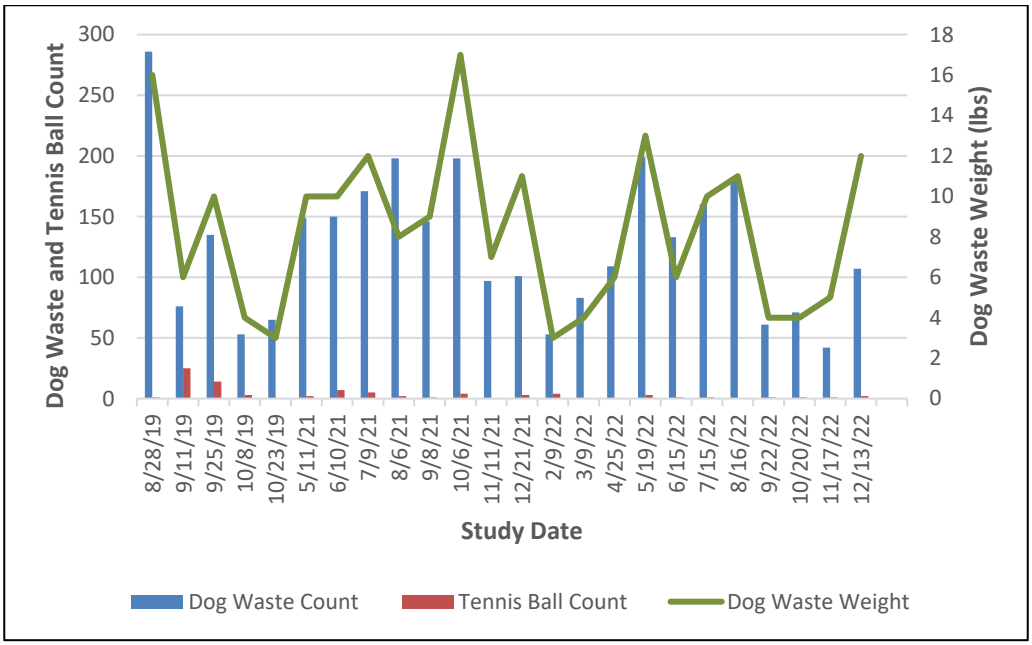
Dog Waste Study

A total of 22 dog waste monitoring visits have been conducted within the study area at the time of this memo. Apart from the general decline since the initial collection date, the total number of dog waste piles and the weight of dog waste has fluctuated between collection days. **Table 3** and **Graphs 1** and **2** detail the total number of dog waste piles, weight of dog waste in pounds, coyote scat, and tennis balls detected during each study. Locations of dog waste, coyote scat, and tennis balls observed during all monitoring visits are depicted in **Figure 7, Dog Waste Study Results**. Representative photographs of dog waste study collections are included in **Attachment D**.

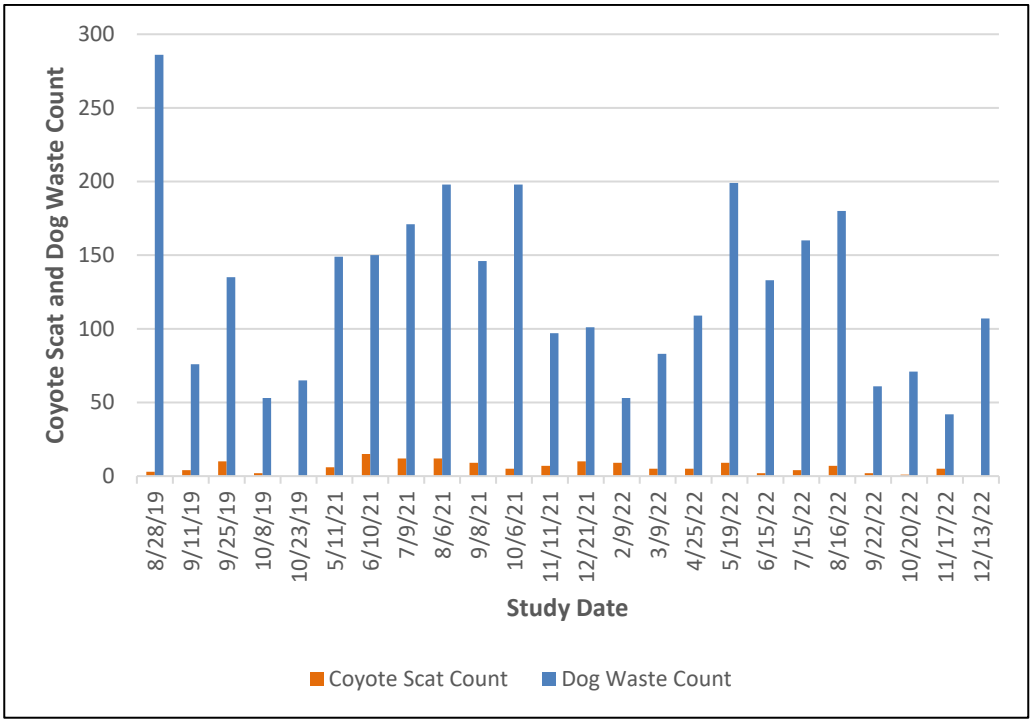
TABLE 3
VILLAGE H DOG WASTE STUDY RESULTS

Date	Pounds of Dog Waste	Dog Waste Count	Coyote Scat Count	Tennis Ball Count
8/28/2019	16	286	3	1
9/11/2019	6	76	4	25
9/25/2019	10	135	10	14
10/8/2019	4	53	2	3
10/23/2019	3	65	0	3
5/11/2021	10	149	6	2
6/10/2021	10	150	15	7
7/9/2021	12	171	12	5
8/6/2021	8	198	12	2
9/8/2021	9	146	9	1
10/6/2021	17	198	5	4
11/11/2021	7	97	7	0
12/21/2021	11	101	10	3
2/9/2022	3	53	9	4
3/9/2022	4	83	5	0
4/25/2022	6	109	5	0
5/19/2022	13	199	9	3
6/15/2022	6	133	2	1
7/15/2022	10	160	4	1
8/16/2022	11	180	7	0
9/22/2022	4	61	2	1
10/20/2022	4	71	1	1
11/17/2022	5	42	5	1
12/13/2022	12	107	0	2
Total	**201**	**3,023**	**144**	**81**

GRAPH 1
VILLAGE H DOG WASTE STUDY RESULTS



GRAPH 2
VILLAGE H DOG WASTE STUDY RESULTS: COYOTE SCAT VERSUS DOG WASTE



Discussion

Wildlife monitoring studies at Village H ran from June 28, 2019, to December 13, 2022, for a total of 1,265 days. Using a subset of the data, previous memorandums summarized wildlife monitoring results related to specific changes in public use – trail opening to the public in August 2019 and trail closure from March 23, 2020, to May 4, 2020, during the COVID-19 pandemic (ESA 2019, 2020). Relevant results from these memorandums are referenced below to provide a holistic discussion on wildlife presence and movement patterns at Village H. Results from the three wildlife monitoring studies provide a baseline for the types of wildlife and their movement patterns at Village H.

Remote Wildlife Cameras

Remote wildlife cameras were installed to identify wildlife species utilizing Village H and general movement patterns, such as frequently used pathways and time of usage. Previous memorandums concluded that wildlife detections decreased after Village H reopened to the public and also during the 30-day trail closure during the COVID-19 pandemic (ESA 2019, 2020), suggesting that wildlife species', particularly mammals, use of Village H was negatively impacted by public use. The detection times for all wildlife species, other than birds, were predominantly at night (see individual camera graphs provided in Attachment A), suggesting that wildlife species movement patterns may be responding to increased daytime preserve use by humans and associated on-leash dogs. This result was further supported by the fact that detections for all wildlife species at Camera 18 (located on the Village H trail) shifted from both daytime and nighttime prior to the trail closure to predominantly daytime during the trail closure due to reduced human and domestic dog use during the COVID-19 pandemic and stay-at-home order (ESA 2020). This finding is consistent with the 2018 Gaynor et al. global meta-analysis that concluded humans have a strong effect on the daily patterns of wildlife activity by influencing animals to become more nocturnal to avoid human activity (Gaynor et al. 2018). Note that wildlife movement studies were not conducted prior to city ownership; therefore, these results cannot be compared to previous conditions onsite before the trail was established. However, the site had been heavily used by people and off-leash dogs prior to city ownership.

Wildlife cameras also confirmed and provided additional local movement patterns within Village H (Figure 6). Coyotes were the most common wildlife species detected and were documented traveling into and out of the Village H property under the wrought-iron gate on the northern boundary of the site adjacent to Carlsbad Village Drive, close to Victoria Avenue. East-west movement between pinchpoints M1-1 and M1-3, through the two east-west movement pathways on Figure 6, seems to be well established based on camera data. Bobcats and smaller mammals (mainly skunks) were documented using the undercrossing at pinchpoint M1-2. Coyotes, bobcats, and smaller mammals (mainly raccoons, opossums, and skunks) were documented using the brow ditch between the chain-link fencing associated with the RV storage area and Carlsbad Municipal Water District (CMWD) property. This movement pathway is likely the main pathway wildlife are using to move between the two HMP hardline preserve areas. Very little wildlife was captured at the M1-4 pinchpoint located at the southern end of the off-site preserve.

Roadkill Monitoring

Tamarack Avenue and Carlsbad Village Drive are high-use vehicular roads. Tamarack is a four-lane road with a speed limit of 35 miles per hour and Carlsbad Village Drive is a four-lane road with a speed limit of 40 miles per hour; therefore, these roads are expected to be a barrier for wildlife movement through direct mortality from

vehicle collisions. Roadkill monitoring was conducted along portions of Tamarack Avenue, Carlsbad Village Drive, and Glasgow Avenue that border Village H to determine if these areas were a pinchpoint for medium to large mammal species, as these species demonstrate longer-range wildlife movement patterns and are likely more threatened by habitat fragmentation from roads (Ng et al. 2004). All roadkill observations detected during the roadkill monitoring period were small mammals or birds, suggesting that medium to large mammal species, such as coyote, may be able to cross pinchpoint M1-1 across Carlsbad Village Drive at street level relatively successfully, as documented on remote wildlife cameras.

Dog Waste Studies

As the study area was historically used by local residents and off-leash dogs, dog waste studies were initiated to gather data on how reopening Village H to the public impacted on-the-ground conditions in the form of dog waste left along trails and within adjacent open space areas. Once the city trail was opened to the public, a dog waste station was installed and on-leash dogs were allowed only on the authorized trail within Village H. A significant amount of dog waste has been picked up during the entire study period, suggesting that many dog owners using Village H are not picking up after their dogs. Most dog waste was documented either on or within 3 feet of the city trail, suggesting that, in general, dogs are likely leashed and not entering the adjacent open space and HMP hardline preserve areas. An exception to this is the grassy area just south of Carlsbad Village Drive, between the trailhead and residences to the east. A high number of dog waste piles were consistently observed between the city trail and residences to the east, and numerous tennis balls (i.e., dog toys) were found in the western half of the same grassy area by the trailhead, indicating that unauthorized off-leash dogs are still an issue on-site and a threat to the adjacent coastal sage scrub habitat. If the total number of dog waste detections is used as a proxy for public usage, these results suggest that public use within Village H varies across months, assuming dog owners who do not pick up dog waste never pick up dog waste. Higher amounts of dog waste were present during the summer months (June, July, and August) versus lower amounts of dog waste collected during the fall months (September, October, and November). There is a general decline in dog waste since the first collection date which included all previously uncollected dog waste from the site. It should be noted that some dog waste might remain on-site as it is likely covered by the dense layer of leaf litter in addition to older waste that has likely degraded, and these exceptions are not represented in the results.

ESA and volunteers continue to conduct dog waste studies within the study area, with the next survey date planned for February 28, 2023.

Recommendations

Based on the trends detected from the results presented above, we recommend the following:

- Install additional dog waste stations: Dog waste continues to be detected during monthly dog waste studies. Installing additional dog waste stations along the city trail could increase accessibility for dog owners and may help decrease the overall amount of dog waste present on Village H.
- Install additional signage: Installing signage at the start of the city trail stating allowed public uses, signage reminding dog owners to pick up after their dogs, and signage along the boundary of the adjacent open space and HMP hardline preserve areas could help deter dog owners from allowing their dogs to be off-leash, encourage them to pick up after their dogs, and define areas that are off-limits to the general public and their pets, respectively.

- Maintain wildlife movement corridors: Wildlife camera data confirmed wildlife movement patterns on Village H. These movement corridors should be maintained to ensure wildlife can continue to enter, utilize, and leave the site effectively.
- Increase public engagement: Engaging the public and educating them on the HMP preserve system, Village H, and the wildlife that use it may help spread awareness of why and how to properly dispose of dog waste in an effort to promote accountability and stewardship of Village H.

References

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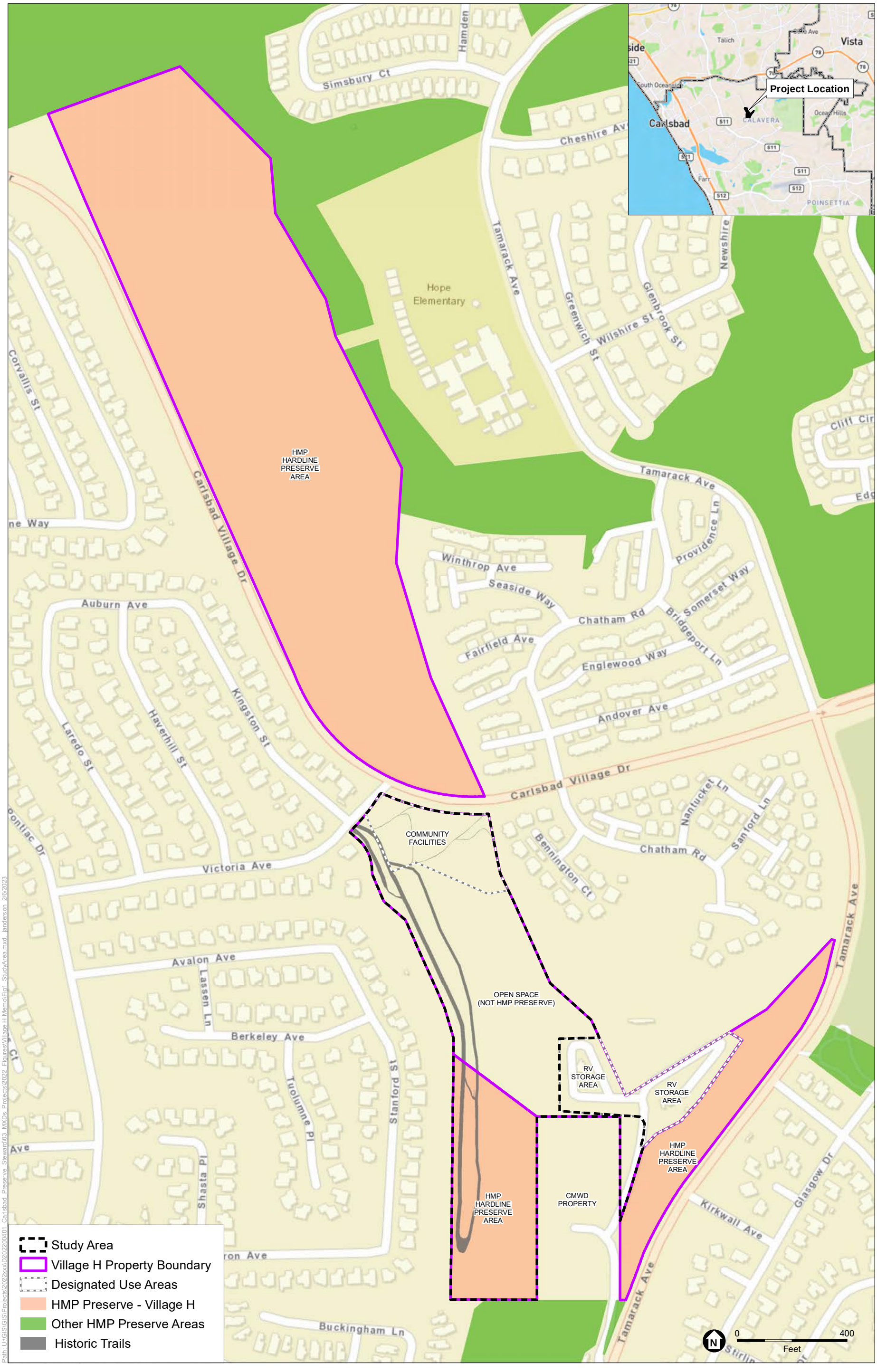
Figures

Attachments



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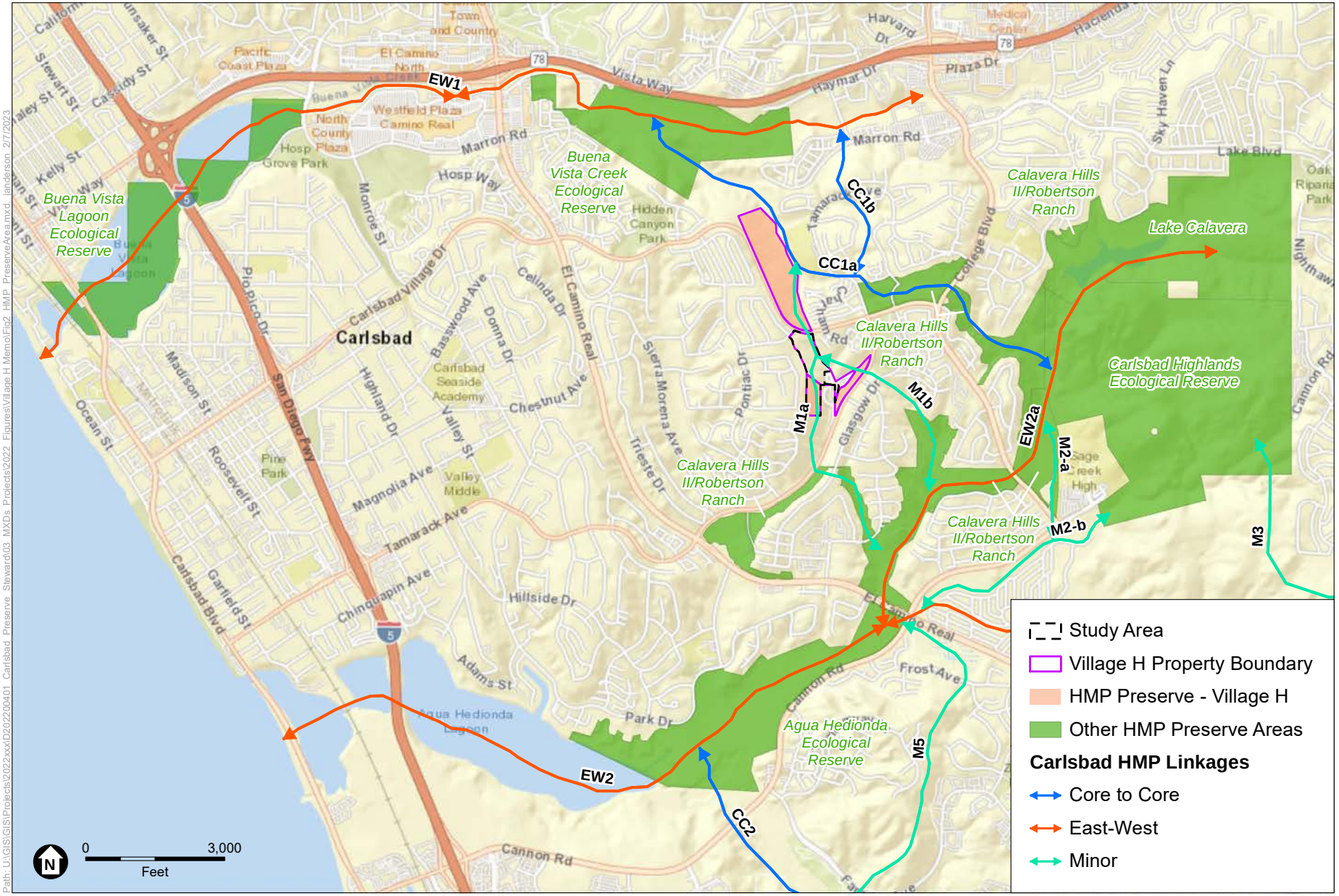
SOURCE: ESRI

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 1
Study Area Location

ESA



SOURCE: ESRI; City of Carlsbad, Environmental Science Associates and Center for Natural Lands Management. 2015.

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 2
Carlsbad HMP Linkages

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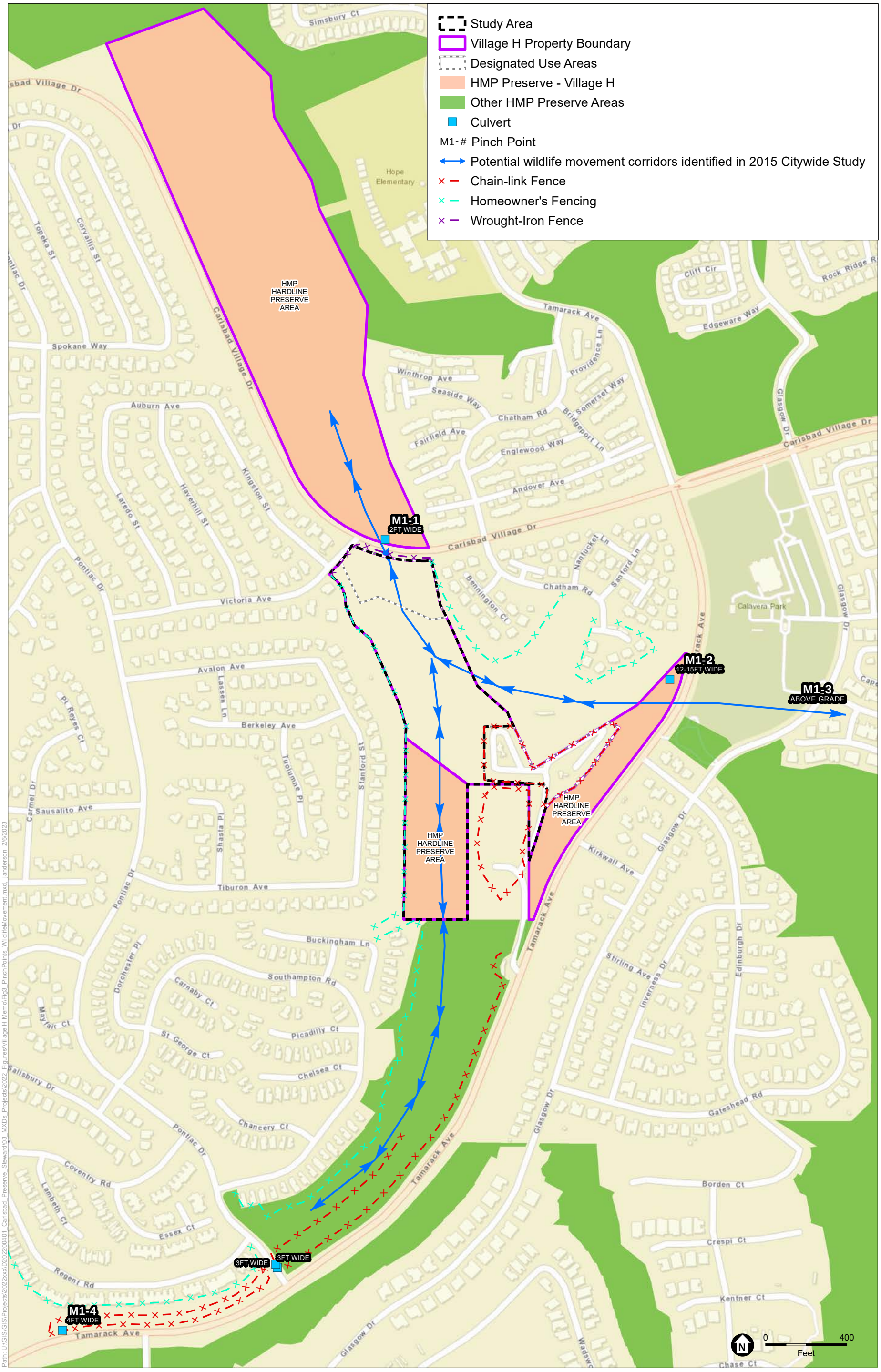

SOURCE: ESRI; City of Carlsbad, Environmental Science Associates and Center for Natural Lands Management. 2015.

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 3
Pinchpoints and Potential Wildlife Movement Corridors

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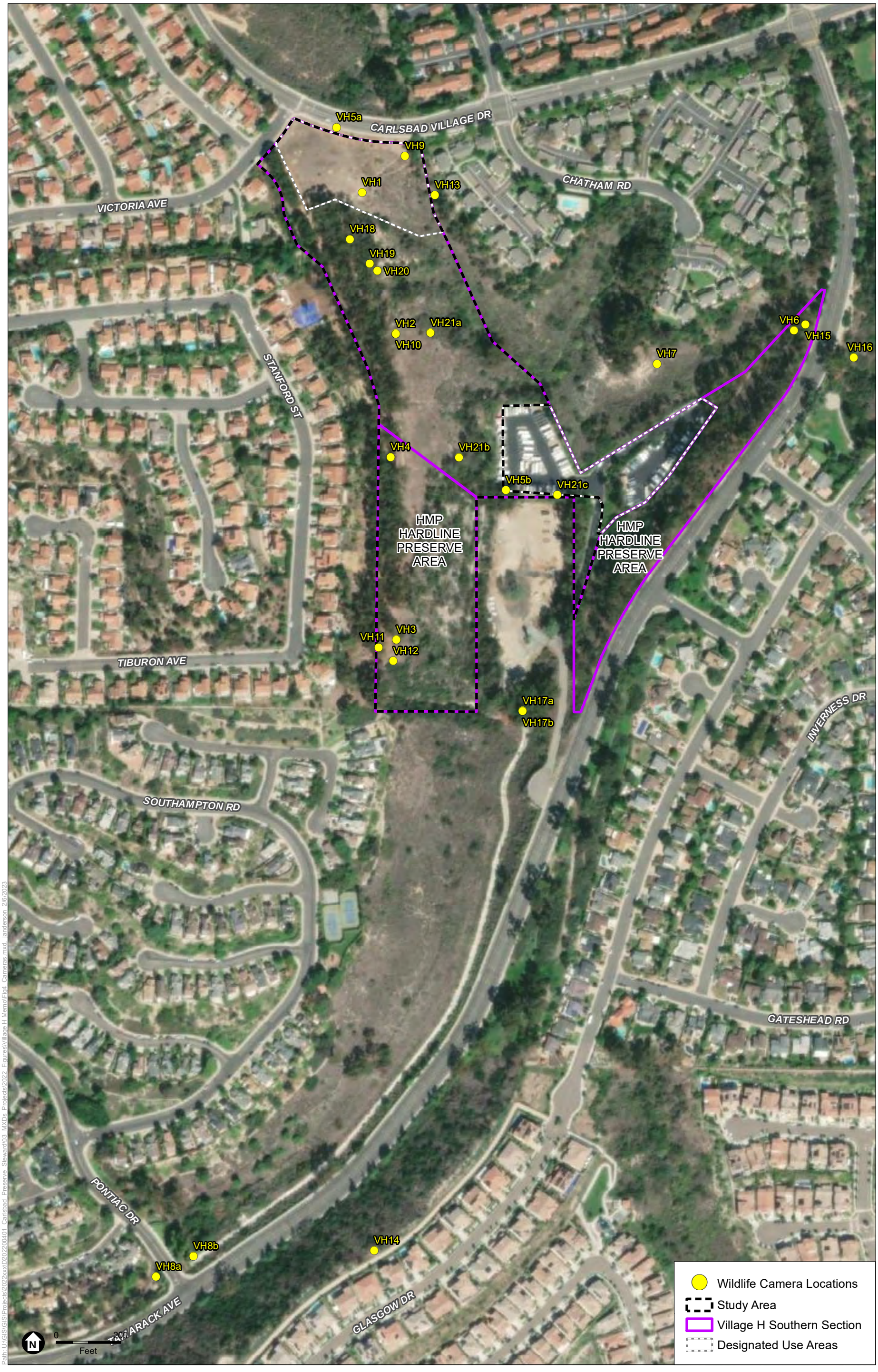

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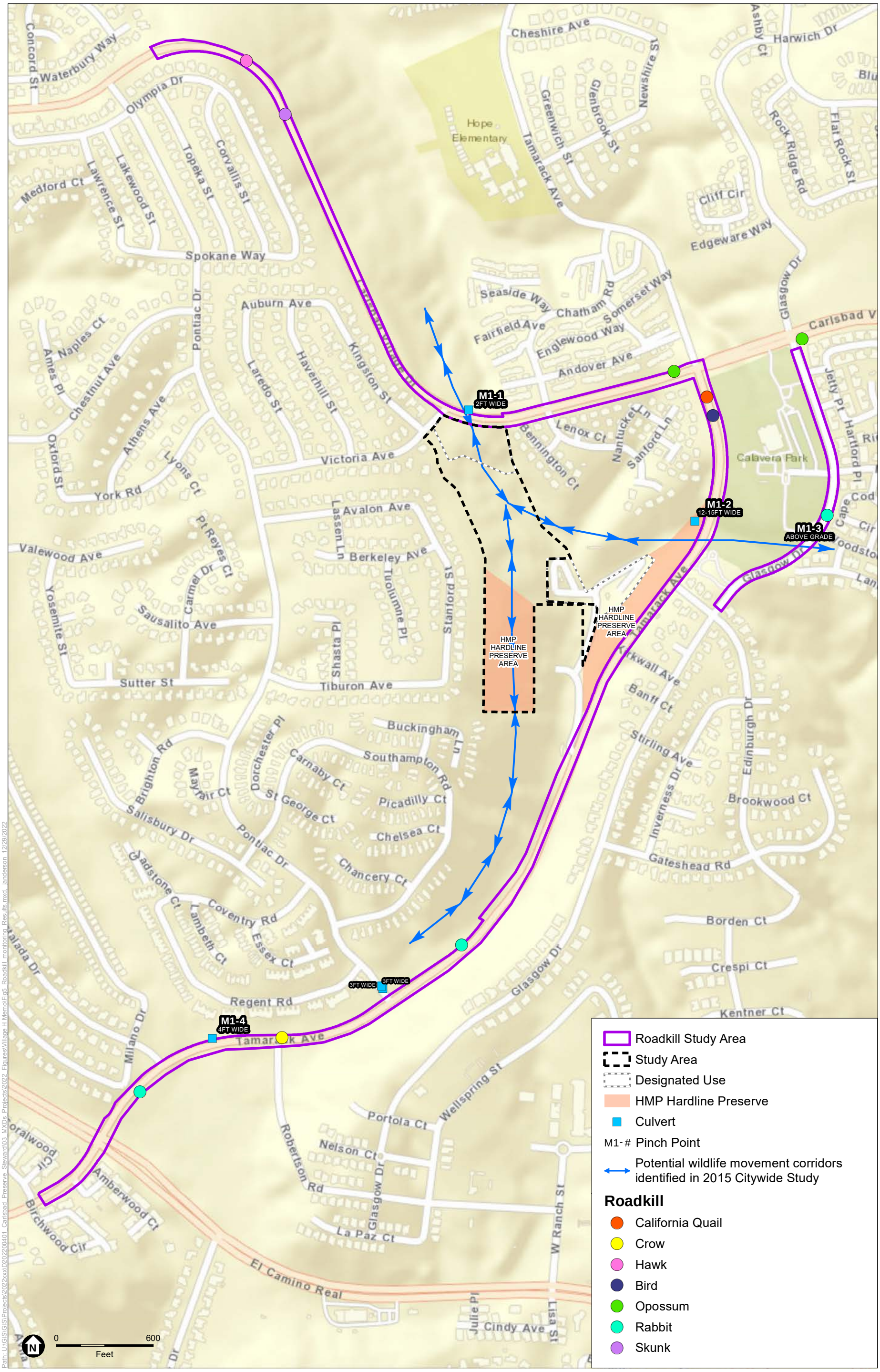
SOURCE: ESRI

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 4
Remote Wildlife Camera Locations

ESA



SOURCE: ESRI; City of Carlsbad, Environmental Science Associates and Center for Natural Lands Management. 2015.

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 5
Roadkill Monitoring Results

ESA

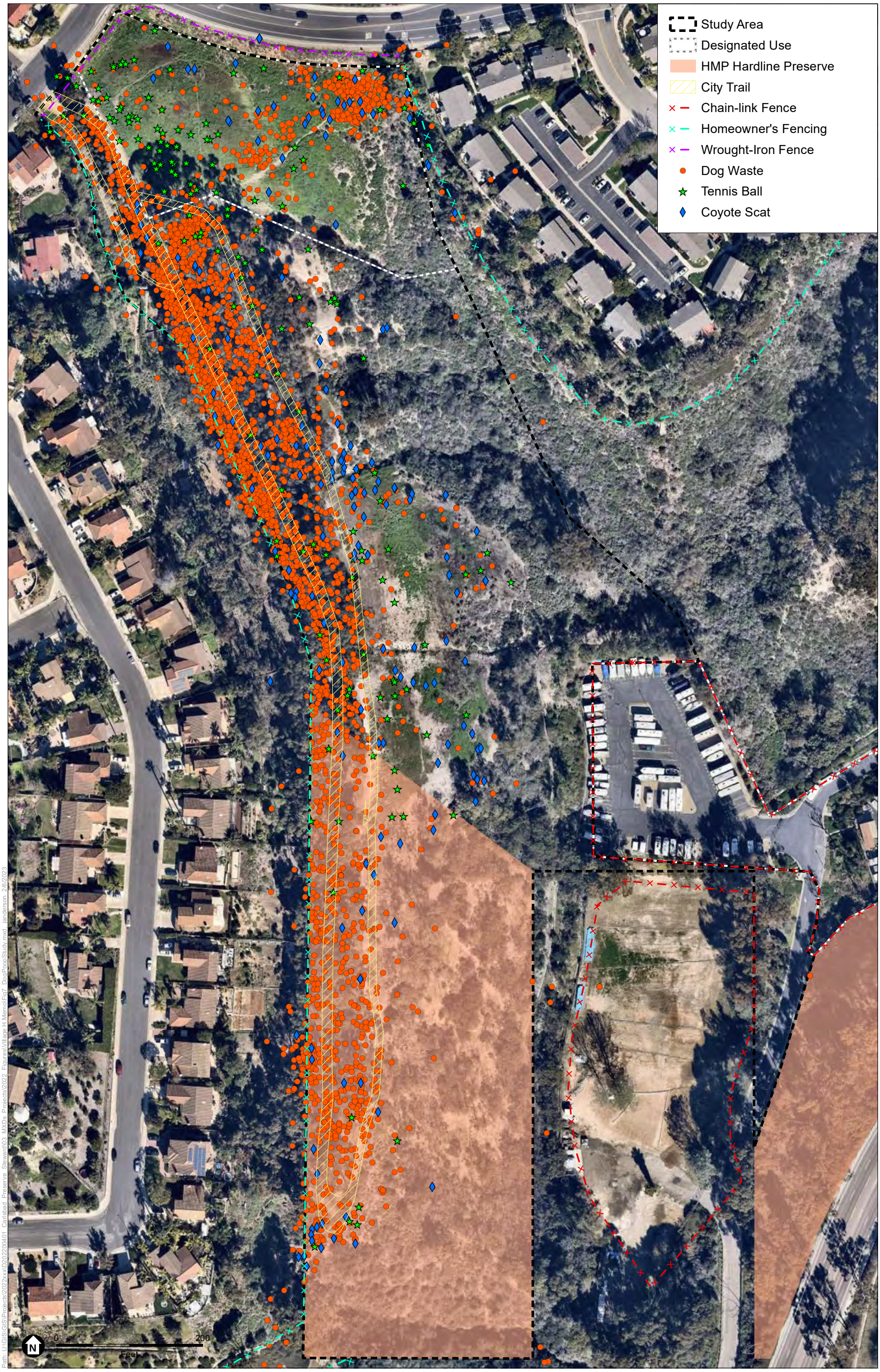
Path: U:\GIS\GIS\Projects\2022xxx\D20220040 1 Carlsbad Preserve Steward\03 MXDs Projects\2022 Figures\Village H Memo\Fig6 Updated PinchPoints WildlifeMovement.mxd jlanderson 2/6/2023

SOURCE: ESRI; City of Carlsbad, Environmental Science Associates and Center for Natural Lands Management. 2015.

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 6
Updated Wildlife Movement Corridors

ESA



SOURCE: ESRI; City of Carlsbad

City of Carlsbad Village H Wildlife Movement Study Summary

Figure 7
Dog Waste Study Results

ESA

Attachment A

Village H Remote Wildlife Camera Full Results

TABLE 1
VILLAGE H REMOTE WILDLIFE CAMERA DETECTIONS – FULL RESULTS FROM JUNE 25, 2019, THROUGH NOVEMBER 17, 2022
(NUMBER OF INDIVIDUALS DETECTED)

Wildlife Camera Location		Coyote		Bobcat		Skunk		Rodents, Rabbits, Raccoons		Bird		Off-leash Dog		On-leash Dog		Human	
Time Period[1]	Number of Days Active	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
VH1	136	64	281	1	12	0	11	16	5	28	6	407	10	26	0	286	4
VH2[2]	42	1	23	0	0	0	0	5	8	0	0	72	4	31	2	149	4
VH3[2]	44	2	4	0	0	0	0	0	0	1	1	264	1	127	4	634	6
VH4[2]	11	0	1	0	0	0	0	0	0	0	0	105	6	84	3	283	9
VH5a	177	0	2	0	0	0	0	0	2	0	1	0	0	0	0	1	0
VH5b	505	8	101	4	26	0	3	0	9	6	1	0	0	0	0	0	0
VH6[3]	99	7	0	1	9	0	7	7	4	3	1	0	0	0	0	1	0
VH7	174	16	141	3	8	0	16	0	5	2	0	0	0	0	0	1	0
VH8a	136	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	3
VH8b	62	4	20	6	22	0	4	4	103	14	0	2	1	1	0	166	60
VH9[4]	106	8	76	1	13	0	2	4	7	1	0	160	0	6	0	104	0
VH10[2,4]	14	0	1	0	0	0	0	0	0	1	0	2	0	0	0	5	0
VH11[5]	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VH12[5]	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VH13[6]	98	4	141	2	21	0	7	5	17	22	0	210	5	1	0	75	1
VH14[3,6]	20	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
VH15[7]	112	0	5	9	27	0	82	4	32	10	0	0	0	0	0	17	4
VH16[7]	112	0	1	11	38	2	122	17	66	10	0	1	0	2	0	0	0
VH17a	112	11	27	8	15	0	21	2	50	23	2	1	0	0	0	76	0
VH17b	538	37	55	12	40	0	1	62	26	116	1	1	0	0	0	1	0
VH18	49	12	43	0	0	0	0	0	0	0	1	579	32	619	27	1848	60
VH19	16	0	6	0	1	0	1	0	0	0	0	8	0	1	0	12	0
VH20[8]	49	7	13	0	0	0	0	1	6	5	0	85	2	6	0	90	2

TABLE 1
VILLAGE H REMOTE WILDLIFE CAMERA DETECTIONS – FULL RESULTS FROM JUNE 25, 2019, THROUGH NOVEMBER 17, 2022
(NUMBER OF INDIVIDUALS DETECTED)

Wildlife Camera Location		Coyote		Bobcat		Skunk		Rodents, Rabbits, Raccoons		Bird		Off-leash Dog		On-leash Dog		Human	
Time Period[1]	Number of Days Active	D	N	D	N	D	N	D	N	D	N	D	N	D	N	D	N
VH21a	34	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
VH21b	181	15	172	2	9	0	0	0	1	17	1	0	0	0	0	2	0
VH21c	680	50	283	8	25	0	5	4	41	198	3	0	0	0	0	2	0
	Total	***248***	***1397***	***68***	***266***	***2***	***282***	***131***	***382***	***457***	***18***	***1899***	***62***	***904***	***36***	***3813***	***162***

NOTES:

[1] Time Period D: Day defined as when it is light out; not defined by time.
Time Period N: Night defined as when it is dark out; not defined by time.

[2] Cameras VH2, VH3, VH4, and VH10 were pulled from the ground on August 10, 2019, and were not reinstalled due to potential for additional vandalism. No video data was collected at these locations after August 10, 2019.

[3] Cameras VH6 and VH14 were pulled from the ground on October 2, 2019 and were not reinstalled due to potential for additional vandalism. No video data was collected this location after October 2, 2019.

[4] Cameras VH9 and VH10 were installed on July 25, 2019.

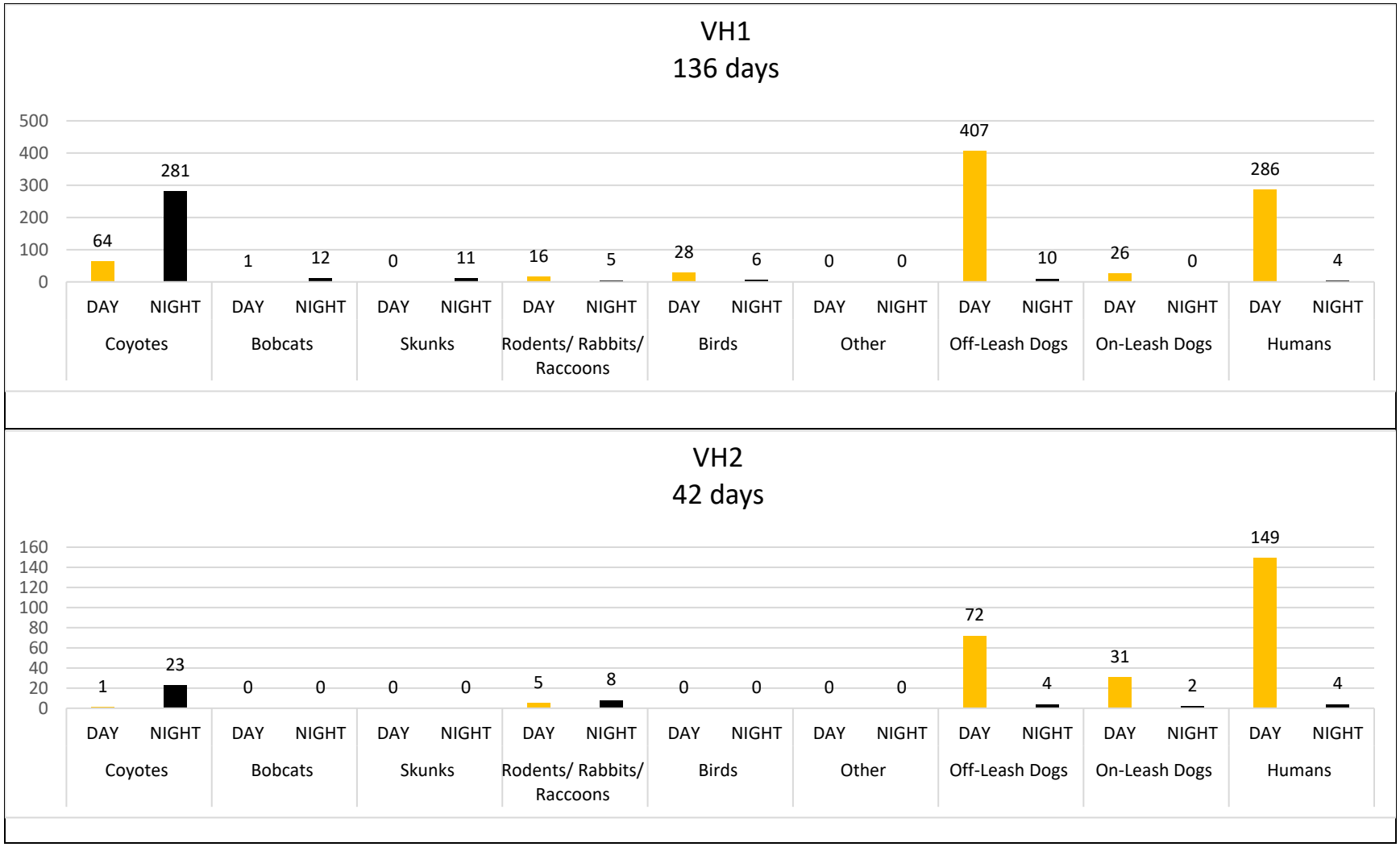
[5] Cameras VH11 and VH12 were installed on August 23, 2019, and were stolen a few days later. No video data was collected from this location after August 23, 2019.

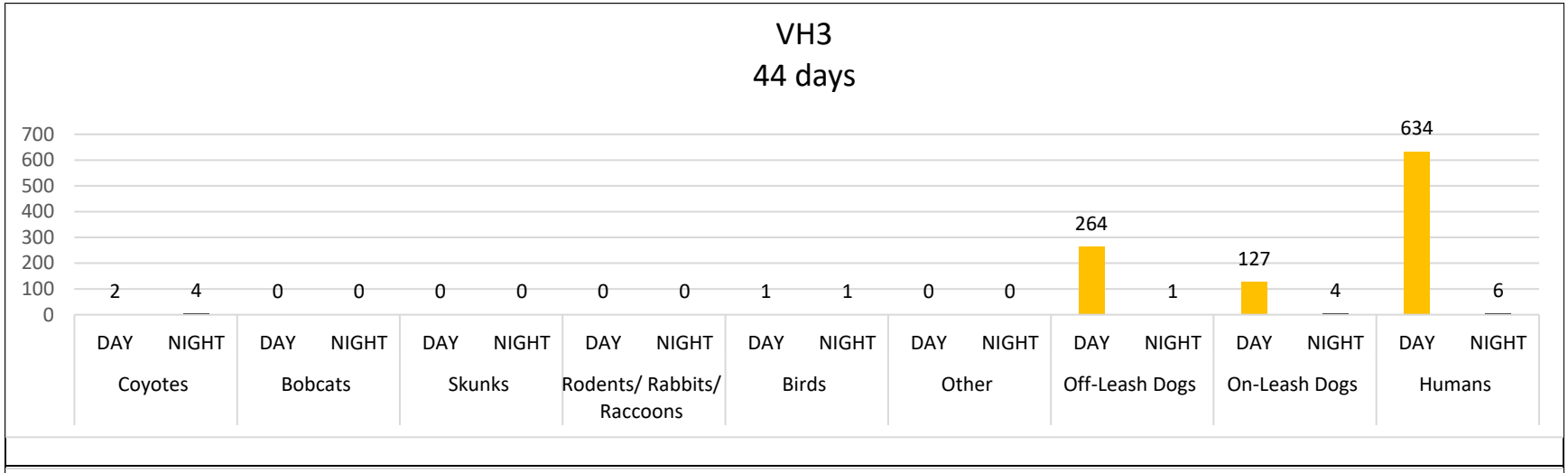
[6] Cameras VH13 and VH14 were installed on September 12, 2019.

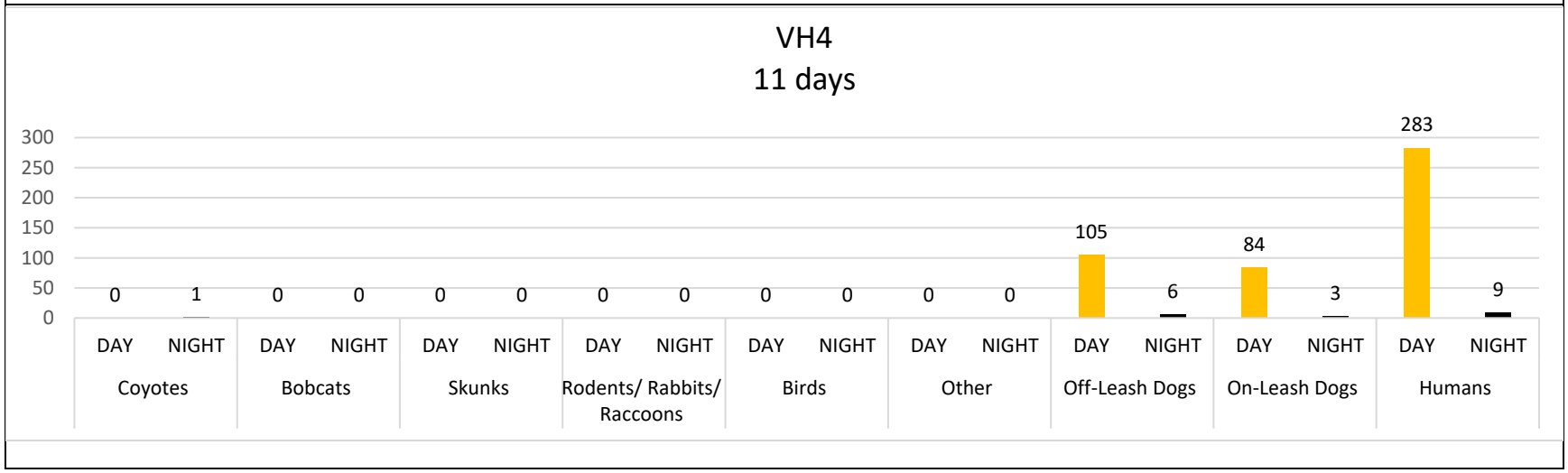
[7] Cameras VH15 and VH16 were installed on September 19, 2019.

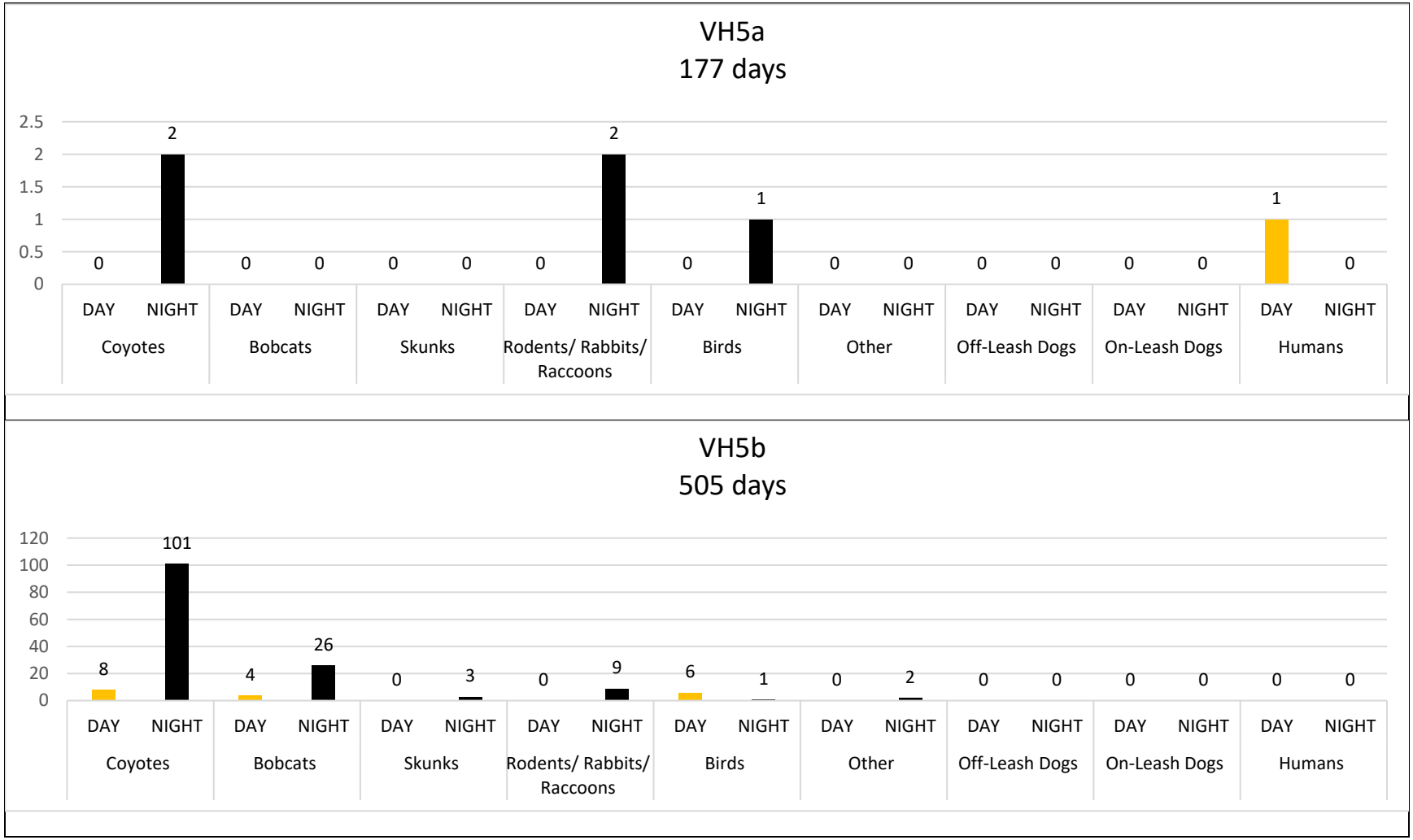
[8] Camera VH20 is a CNLM-installed and maintained camera. Data for this camera runs from July 3, 2019, to September 3, 2019.

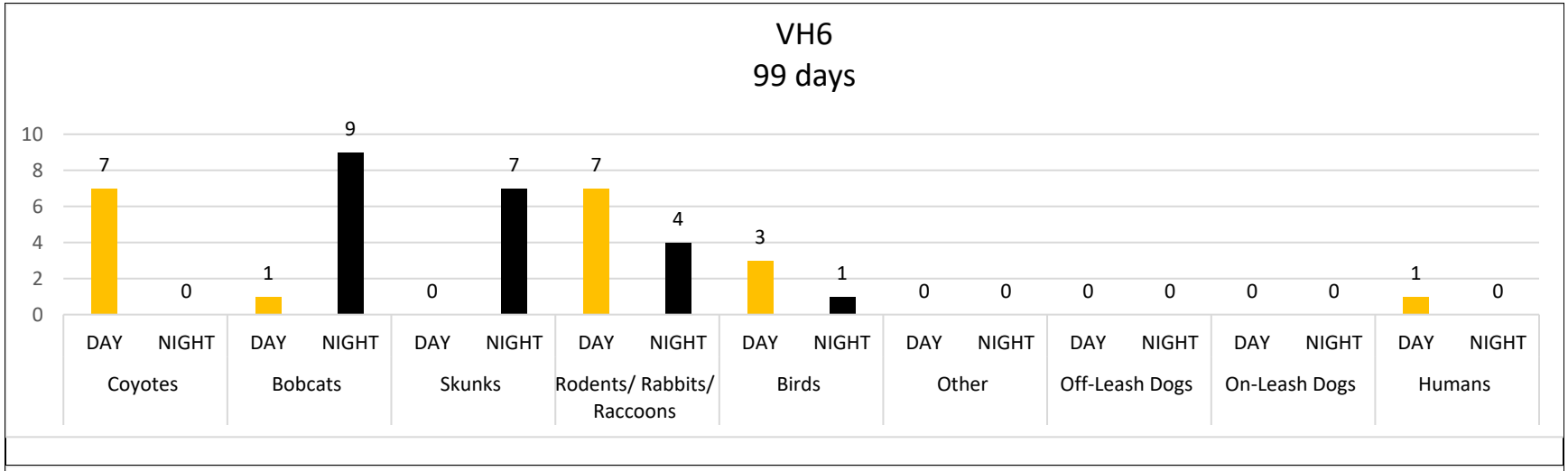
Village H Remote Wildlife Camera Detections – Relative Number of Wildlife, Humans, and Dogs at Selected Locations

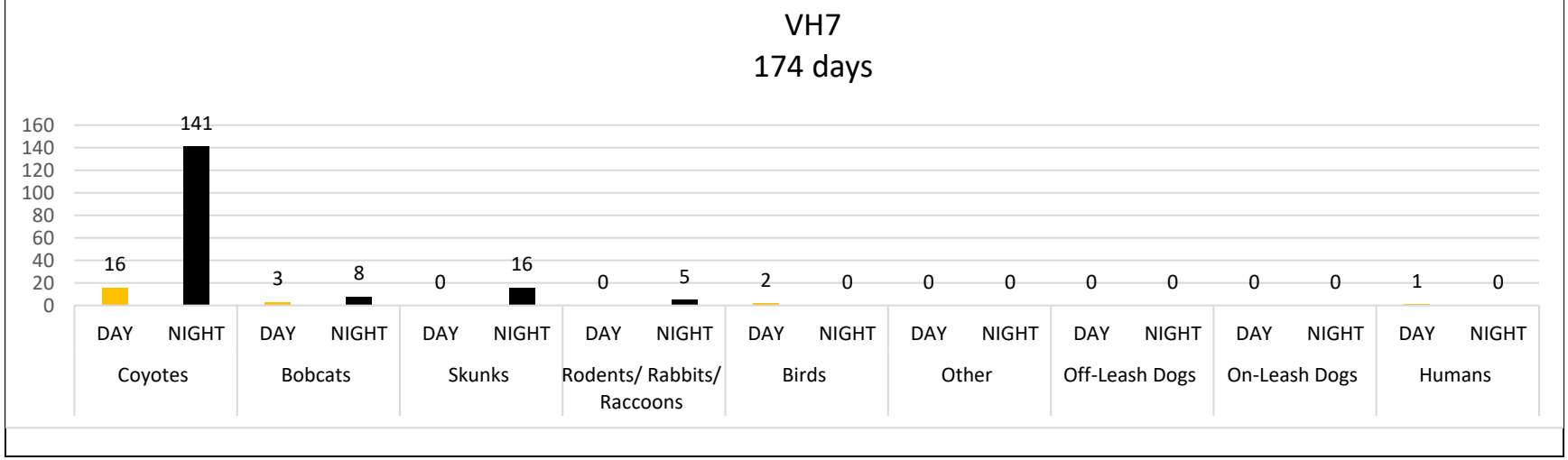


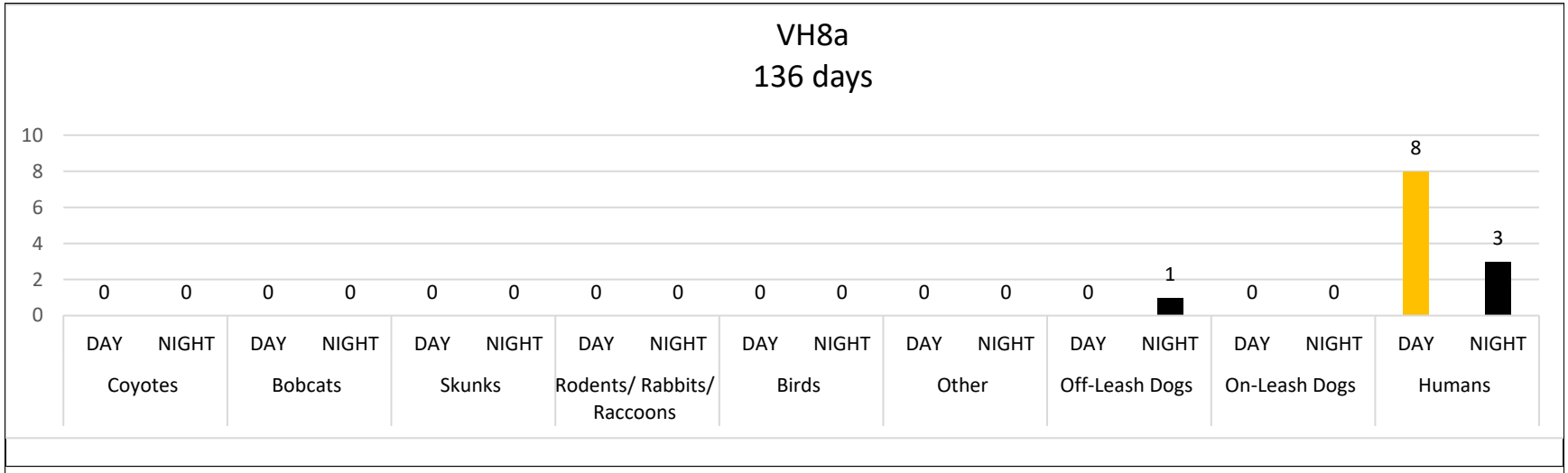

VH3
44 days
700
600
500
400
300
200
100
0
2
4
0
0
0
0
0
0
1
1
0
0
264
1
127
4
634
6
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

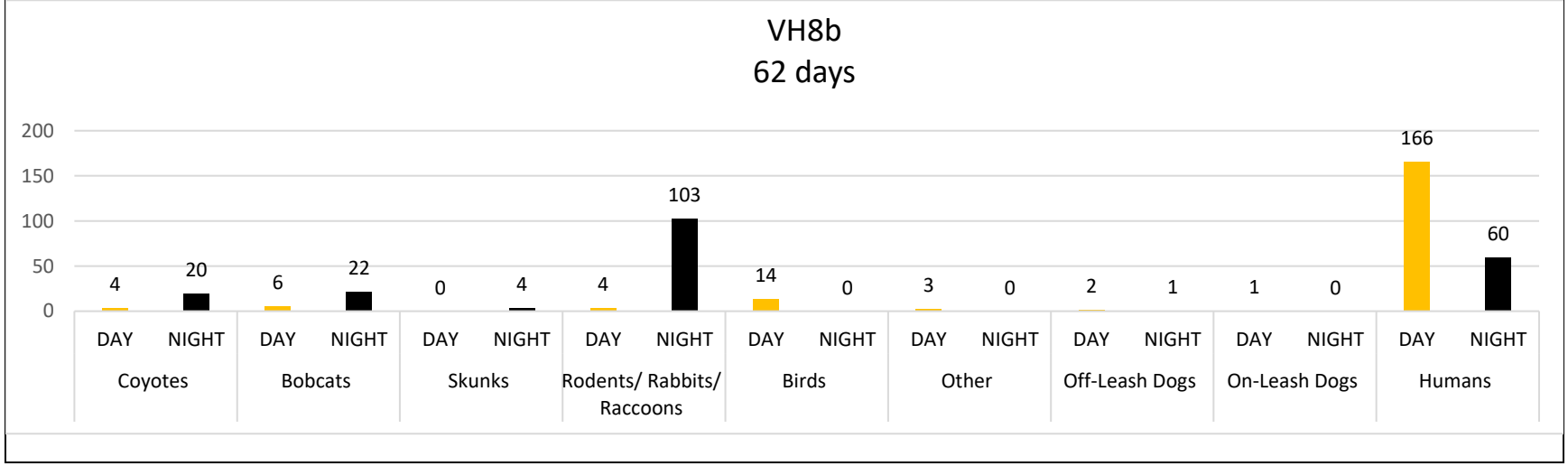

VH4
11 days
300
250
200
150
100
50
0
0
1
0
0
0
0
0
0
0
0
0
0
105
6
84
3
283
9
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

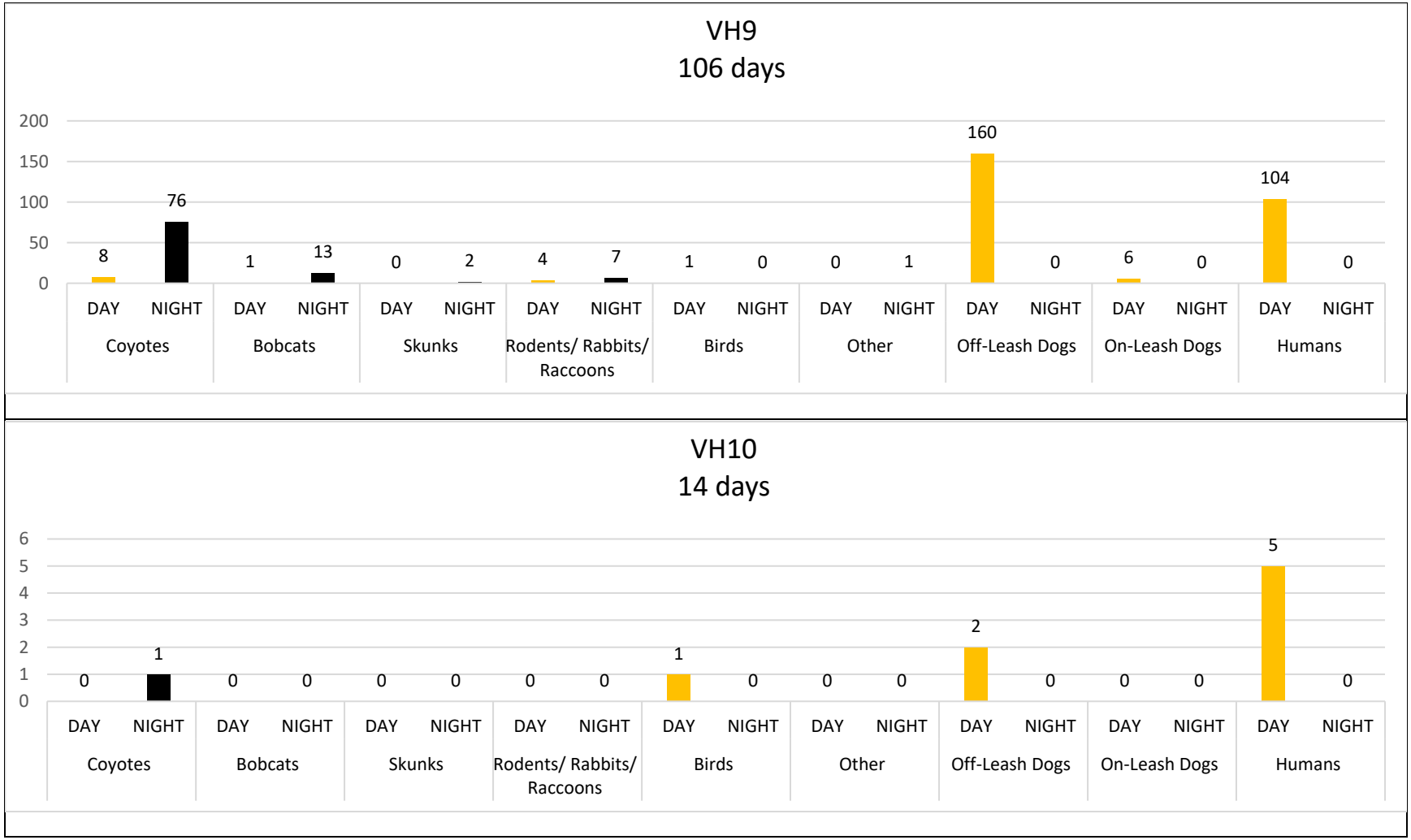

VH5a
177 days
2.5
2
1.5
1
0.5
0
0 2 0 0 0 0 0 2 0 1 0 0 0 0 0 0 1 0
DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans
VH5b
505 days
120
100
80
60
40
20
0
8 101 4 26 0 3 0 9 6 1 0 2 0 0 0 0 0 0
DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

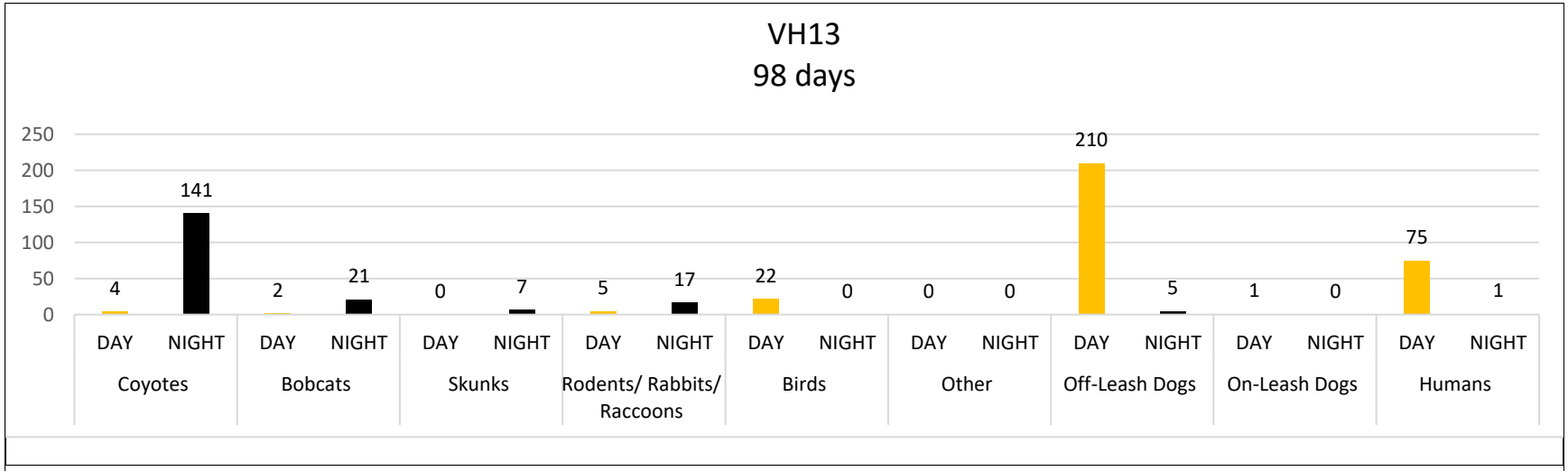

VH6
99 days
10
8
6
4
2
0
7
0
1
9
0
7
7
4
3
1
0
0
0
0
0
0
1
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

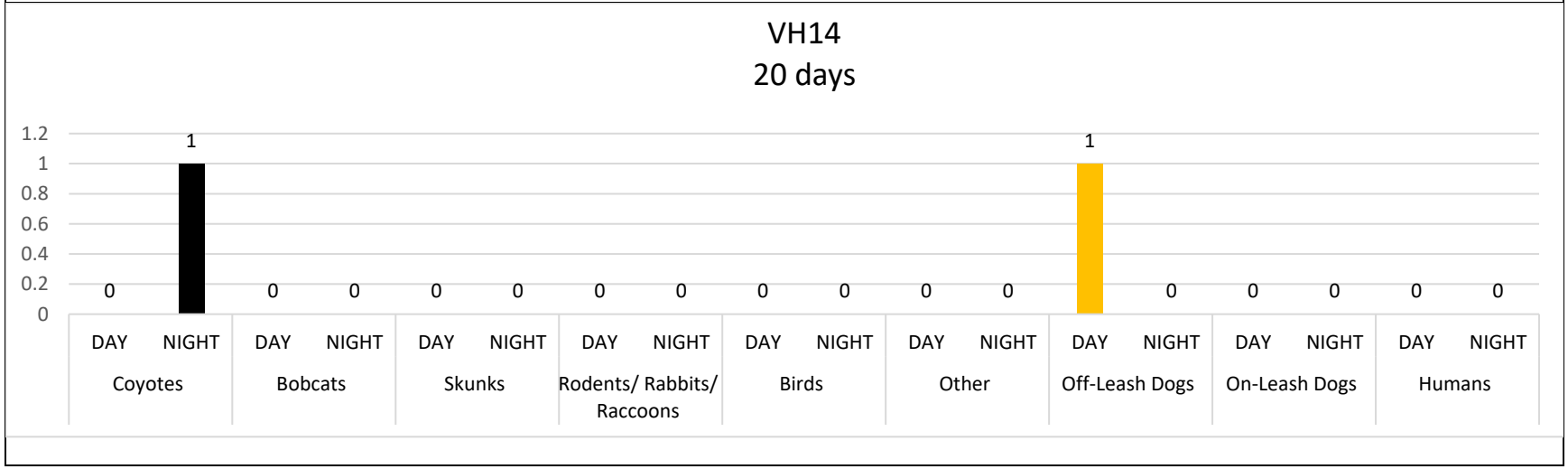

VH7
174 days
160
140
120
100
80
60
40
20
0
16
141
3
8
0
16
0
5
2
0
0
0
0
0
0
0
0
1
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

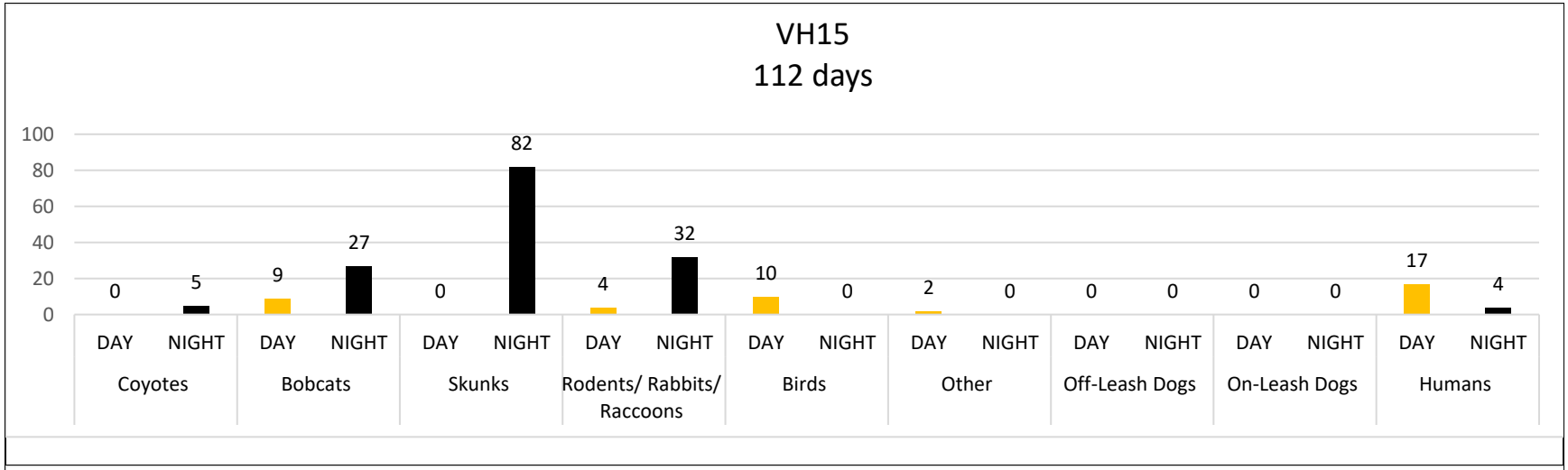

VH8a
136 days
10
8
6
4
2
0
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 8 3
DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

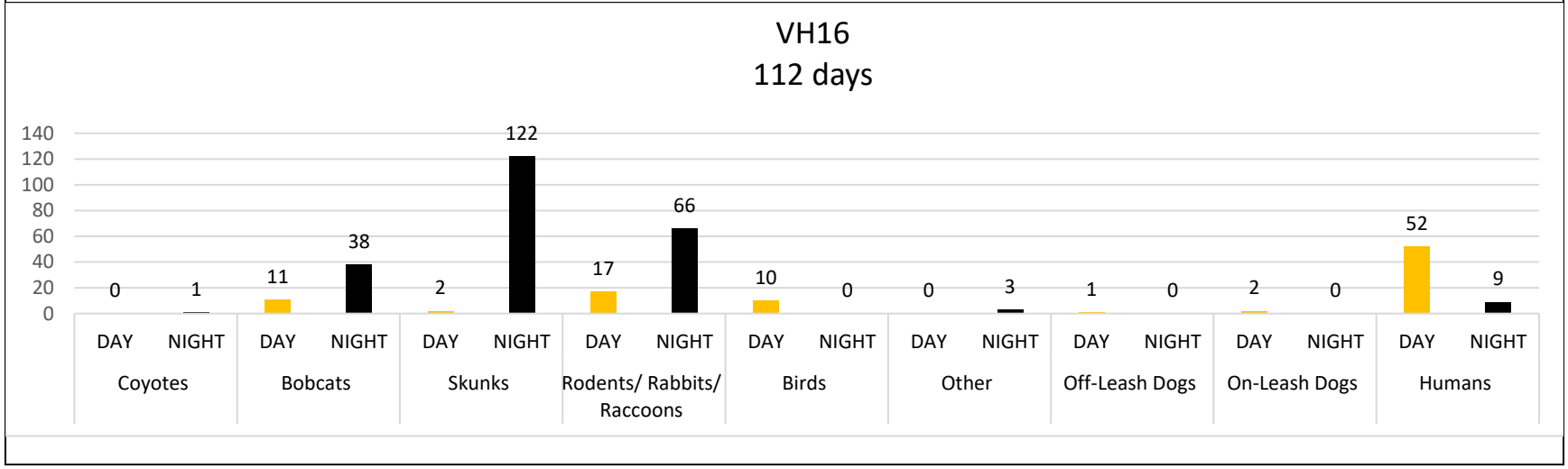

VH8b
62 days
200
150
100
50
0
4 20 6 22 0 4 4 103 14 0 3 0 2 1 1 0 166 60
DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

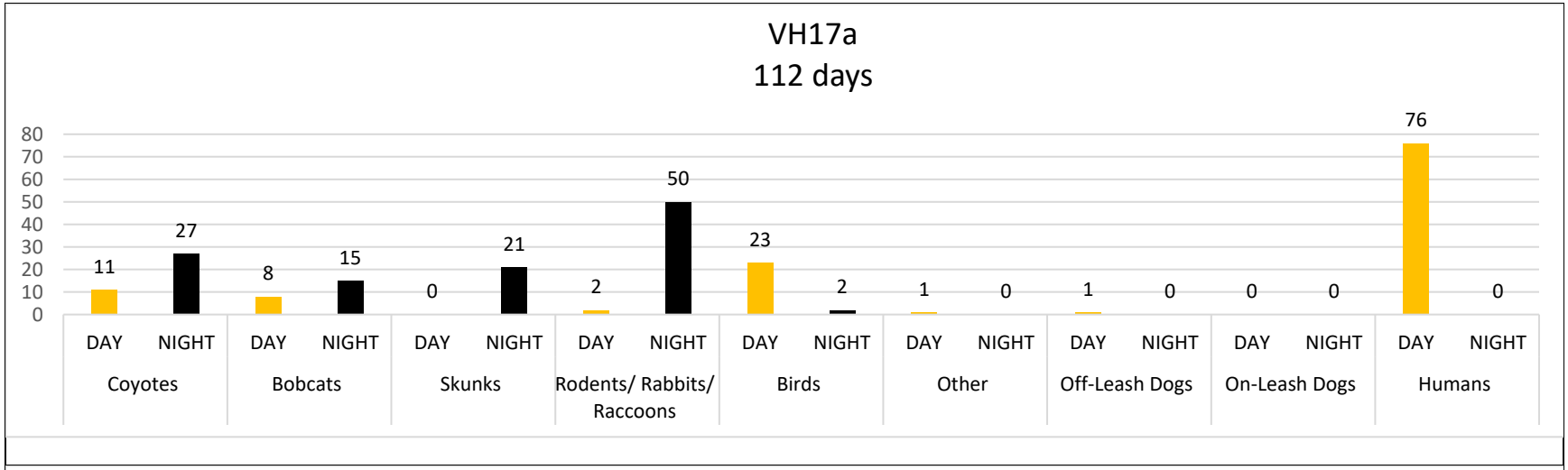

VH9
106 days
200
150
100
50
0
8
76
1
13
0
2
4
7
1
0
0
1
160
0
6
0
104
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans
VH10
14 days
6
5
4
3
2
1
0
0
1
0
0
0
0
0
0
1
0
0
0
2
0
0
0
5
0

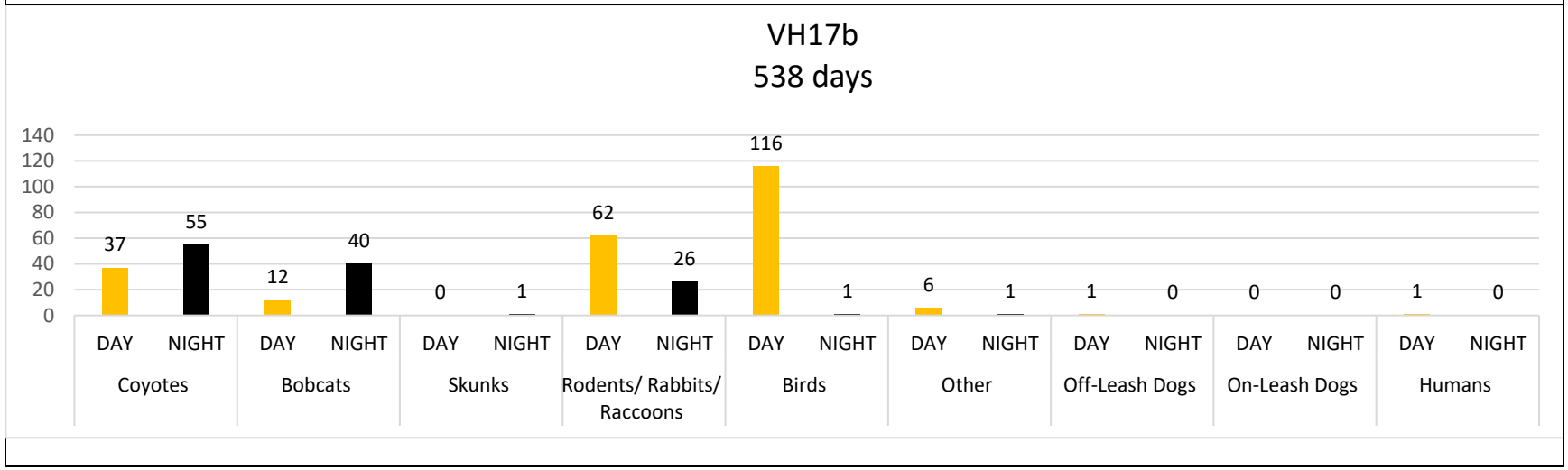

VH13
98 days
250
200
150
100
50
0
4
141
2
21
0
7
5
17
22
0
0
0
210
5
1
0
75
1
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

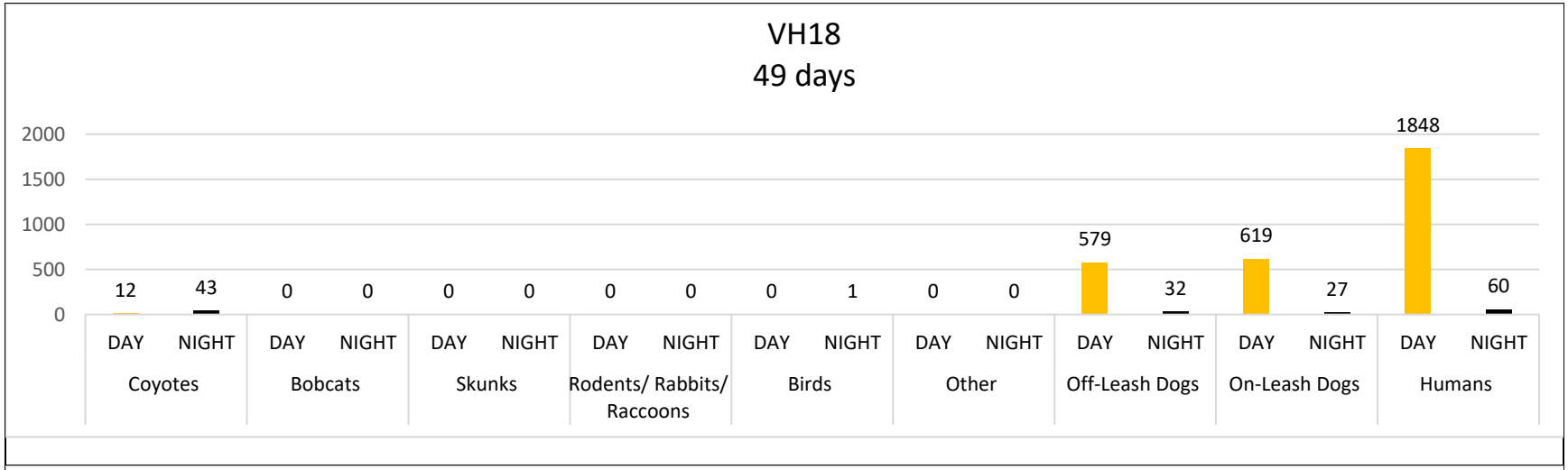

VH14
20 days
1.2
1
0.8
0.6
0.4
0.2
0
0
1
0
0
0
0
0
0
0
0
0
0
1
0
0
0
0
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

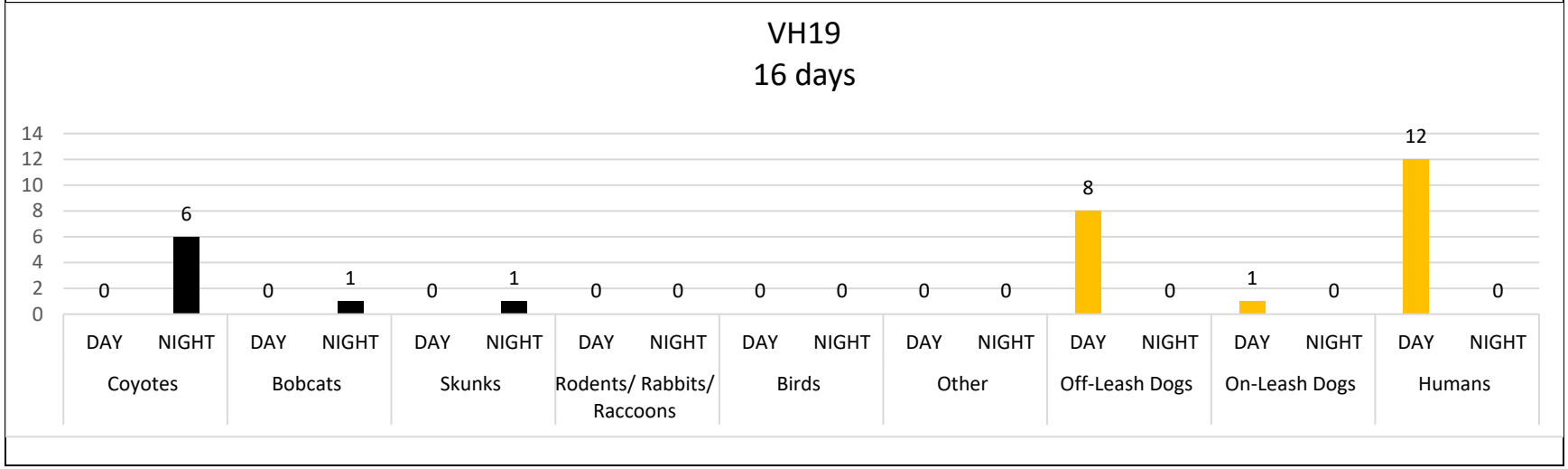

VH15
112 days
100
80
60
40
20
0
0
5
9
27
0
82
4
32
10
0
2
0
0
0
0
0
17
4
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

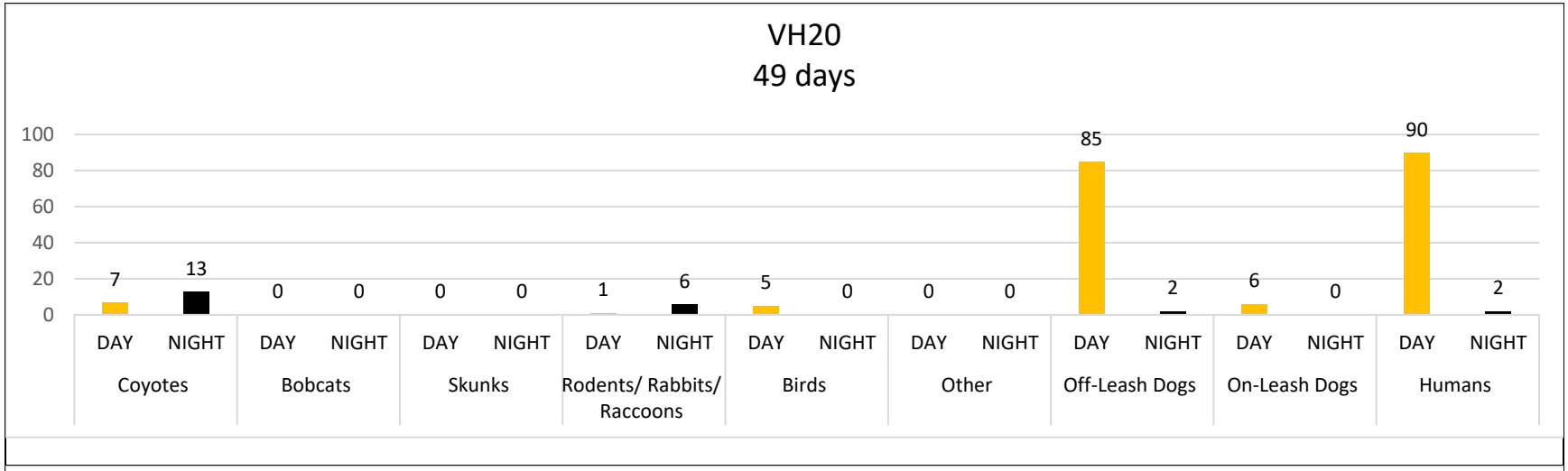

VH16
112 days
140
120
100
80
60
40
20
0
0
1
11
38
2
122
17
66
10
0
0
3
1
0
2
0
52
9
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

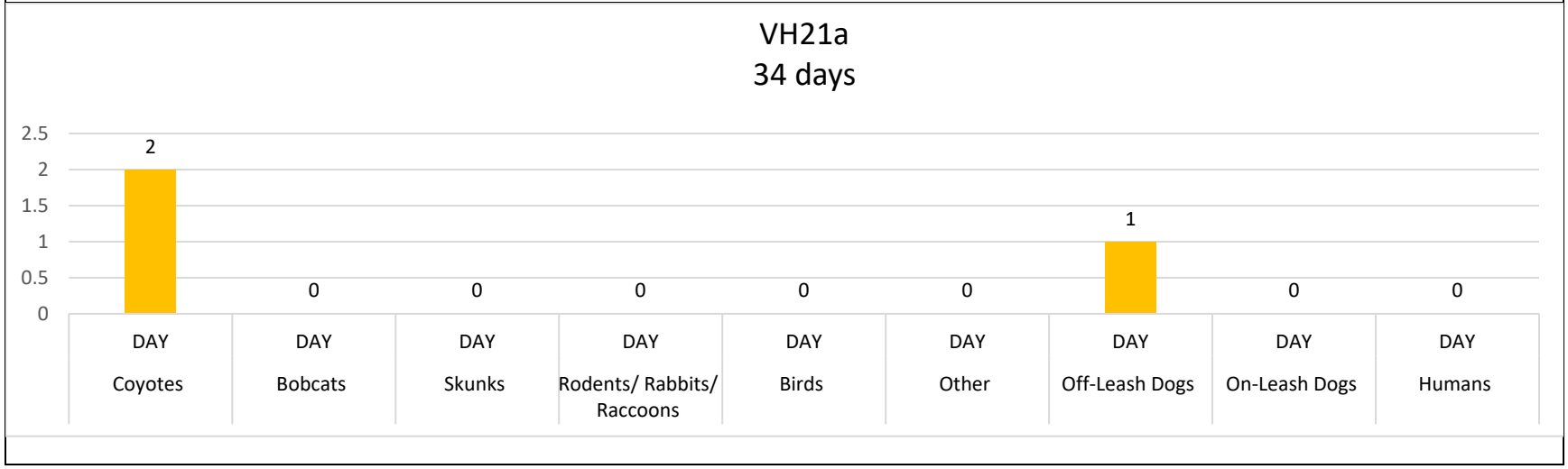

VH17a
112 days
80
70
60
50
40
30
20
10
0
11
27
8
15
0
21
2
50
23
2
1
0
1
0
0
0
76
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans

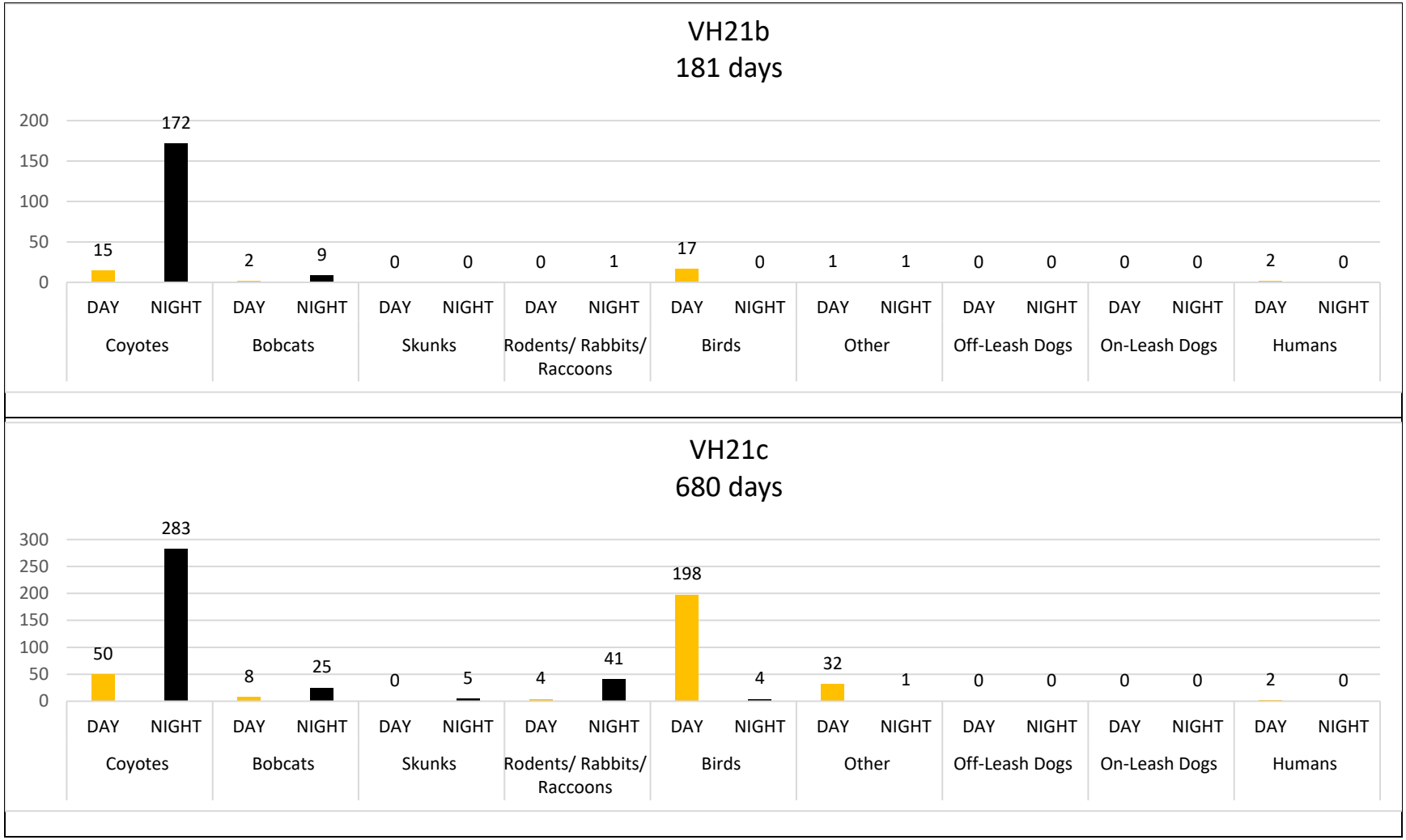

VH17b
538 days
140
120
100
80
60
40
20
0
37
55
12
40
0
1
62
26
116
1
6
1
1
0
0
0
1
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans


VH18
49 days
2000
1500
1000
500
0
12
43
0
0
0
0
0
0
0
1
0
0
579
32
619
27
1848
60
DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans


VH19
16 days
14
12
10
8
6
4
2
0
0
6
0
1
0
1
0
0
0
0
0
0
8
0
1
0
12
0
DAY NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans


VH20
49 days
100
80
60
40
20
0
7
13
0
0
0
0
1
6
5
0
0
0
85
2
6
0
90
2
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans


VH21a
34 days
2.5
2
1.5
1
0.5
0
2
0
0
0
0
0
1
0
0
DAY
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans


VH21b
181 days
200
150
100
50
0
15
172
2
9
0
0
0
1
17
0
1
1
0
0
0
0
2
0
DAY
NIGHT
Coyotes
Bobcats
Skunks
Rodents/ Rabbits/ Raccoons
Birds
Other
Off-Leash Dogs
On-Leash Dogs
Humans
VH21c
680 days
300
250
200
150
100
50
0
50
283
8
25
0
5
4
41
198
4
32
1
0
0
0
0
2
0

Attachment B

Village H Roadkill Survey Dates and Results

TABLE 1
VILLAGE H ROADKILL SURVEY DATES AND RESULTS

Date	Time (start-end)	Surveyor	Location	Species
7/25/19	11:20-11:30 am	Team	Village H	None
7/30/19	2:20-2:30 pm	H. Swarthout	Village H	None
8/1/19	12:45-1:00 pm	A. Sullivan	Village H	None
8/4/19	8:35-8:50 am	K. Merrill	Village H	None
8/6/19	12:50-1:10 pm	H. Swarthout	Village H	None
8/7/19	10:00-10:15 am	A. Lee	Village H	None
8/9/19	2:35-2:50 pm	H. Swarthout	Village H	None
8/10/19	6:55-7:10 am	K. Merrill	Village H	None
8/14/19	10:40-10:55 am	A. Lee	Village H	None
8/16/19	2:45-2:55 pm	H. Swarthout	Village H	None
8/17/19	9:10-9:25 am	K. Merrill	Village H	None
8/18/19	12:40 pm	K. Merrill	Village H	None
8/21/19	11:20-11:35 am	A. Lee	Village H	None
8/23/19	3:28-3:40 pm	H. Swarthout	Village H	None
8/25/19	10:07-10:15 am	K. Merrill	Village H	None
8/28/19	12:15-12:30 pm	A. Sullivan	Village H	Opossum
8/30/10	1:25-1:35 pm	H. Swarthout	Village H	None
8/31/19	9:50-10:00 am	K. Merrill	Village H	None
9/4/19	9:35-9:50 am	A. Lee	Village H	None
9/6/19	10:20-10:35 am	H. Swarthout	Village H	None
9/8/19	9:18-9:28 am	K. Merrill	Village H	None
9/11/19	10:40-11:00 am	A. Lee	Village H	None
9/12/19	10:05-10:17 am	H. Swarthout	Village H	None
9/14/19	8:35-8:45 am	K. Merrill	Village H	None
9/18/19	9:20-9:35 am	A. Lee	Village H	None
9/19/19	9:28-9:46 am	H. Swarthout	Village H	Opossum
9/21/19	9:25-9:36 am	K. Merrill	Village H	None
9/25/19	10:30-10:45 am	A. Sullivan	Village H	None
9/26/19	10:13-10:21 am	H. Swarthout	Village H	None
9/28/19	11:21-11:31 am	K. Merrill	Village H	None
10/2/19	3:30-3:45 pm	A. Sullivan	Village H	None
10/4/19	1:35-1:43 pm	H. Swarthout	Village H	None
10/5/19	8:35-8:45 am	K. Merrill	Village H	None
10/8/19	9:30-9:45 am	A. Sullivan	Village H	None
10/11/19	1:24-1:32 pm	H. Swarthout	Village H	None
10/16/19	11:30-11:39 am	H. Swarthout	Village H	None
10/19/19	9:06-9:13 am	K. Merrill	Village H	None

Date	Time (start-end)	Surveyor	Location	Species
10/23/19	9:30-9:45 am	A. Sullivan	Village H	Rabbit
10/27/19	9:15-9:25 am	K. Merrill	Village H	None
10/30/19	10:00-10:15 am	A. Sullivan	Village H	None
11/2/19	11:09-11:20 am	K. Merrill	Village H	None
11/6/19	9:45-10:00 am	A. Lee	Village H	None
11/8/19	11:06-11:16 am	H. Swarthout	Village H	None
11/9/19	8:27-8:33 am	K. Merrill	Village H	None
11/13/19	1:00-1:15 pm	A. Sullivan	Village H	None
11/15/19	10:19-10:30 am	H. Swarthout	Village H	None
11/16/19	8:32-8:41 am	K. Merrill	Village H	None
11/21/19	11:00-11:15 am	A. Sullivan	Village H	None
11/22/19	3:13-3:27 pm	H. Swarthout	Village H	None
11/23/19	10:04-10:14 am	K. Merrill	Village H	None
11/30/19	12:53-1:03 pm	K. Merrill	Village H	None
12/4/19	12:23-12:33 pm	H. Swarthout	Village H	None
12/5/19	12:45-1:00 pm	A. Sullivan	Village H	Rabbit and Bird
12/6/19	10:28-10:38 am	H. Swarthout	Village H	None
12/8/19	8:45-8:55 am	K. Merrill	Village H	None
12/11/19	3:31-3:42 pm	H. Swarthout	Village H	None
12/13/19	4:15-4:27 pm	H. Swarthout	Village H	Hawk
12/15/19	10:00-10:15 am	K. Merrill	Village H	Barn Owl
12/18/19	10:25-10:35 am	A. Lee	Village H	Barn Owl (same as above)
12/20/19	1:28-1:39 pm	H. Swarthout	Village H	None
12/21/19	9:06-9:13 am	K. Merrill	Village H	None
12/26/19	9:15-9:30 am	A. Sullivan	Village H	Skunk
12/27/19	11:34-11:48 am	H. Swarthout	Village H	Rabbit
12/28/19	8:57-9:07 am	K. Merrill	Village H	None
12/30/19	4:21-4:32 pm	H. Swarthout	Village H	None
12/31/19	11:30-11:45 am	A. Sullivan	Village H	Bird
1/5/20	8:40-8:50 am	K. Merrill	Village H	None
1/8/20	11:00-11:15 am	A. Sullivan	Village H	None
1/10/20	12:16-12:27 pm	H. Swarthout	Village H	None
1/12/20	10:27-10:37 am	K. Merrill	Village H	None
1/13/20	3:30-3:45 pm	A. Sullivan	Village H	None
1/15/20	9:30-9:40 am	A. Sullivan	Village H	None
1/17/20	12:31-12:42 pm	H. Swarthout	Village H	None
1/18/20	10:14-10:23 am	K. Merrill	Village H	None
1/22/20	12:10-12:20 pm	A. Lee	Village H	None

Date	Time (start-end)	Surveyor	Location	Species
1/24/20	12:39-12:50 pm	H. Swarthout	Village H	Hawk
1/26/20	10:14-10:22 am	K. Merrill	Village H	None
1/30/20	10:16-10:25 am	H. Swarthout	Village H	None
2/1/20	8:30-8:40 am	K. Merrill	Village H	None
2/7/20	11:41-11:51 am	H. Swarthout	Village H	None
2/9/20	8:32-8:44 am	K. Merrill	Village H	California Quail
2/13/20	10:14-10:25 am	H. Swarthout	Village H	None
2/16/20	9:05-9:15 am	K. Merrill	Village H	None
2/20/20	11:00-11:09 am	H. Swarthout	Village H	None
2/22/20	8:58-9:06 am	K. Merrill	Village H	None
2/26/20	11:50-12:03 pm	H. Swarthout	Village H	None
3/1/20	10:28-10:37 am	K. Merrill	Village H	None
3/5/20	9:54-10:05 am	H. Swarthout	Village H	None
3/8/20	10:26-10:38 am	K. Merrill	Village H	Rabbit
3/12/20	9:53-10:02 am	H. Swarthout	Village H	Squirrel
3/14/20	9:37-9:47 am	K. Merrill	Village H	None
3/19/20	1:37-1:50 pm	H. Swarthout	Village H	None
3/21/20	10:38-10:48 am	K. Merrill	Village H	None
3/26/20	9:40-9:50 am	H. Swarthout	Village H	None
3/28/20	10:00-10:11 am	K. Merrill	Village H	None
4/2/20	10:39-10:49 am	H. Swarthout	Village H	None
4/4/20	11:07-11:16 am	K. Merrill	Village H	None
4/9/20	9:23-9:33 am	H. Swarthout	Village H	None
4/11/20	9:01-9:09 am	K. Merrill	Village H	None
4/16/20	10:28-10:37 am	H. Swarthout	Village H	None
4/18/20	9:36-9:44 am	K. Merrill	Village H	None
4/23/20	10:16-10:27 am	H. Swarthout	Village H	None
4/25/20	10:22-10:31 am	K. Merrill	Village H	None
4/30/20	9:56-10:07 am	H. Swarthout	Village H	None
5/2/20	11:54 am-12:04 pm	K. Merrill	Village H	None
5/7/20	10:40-10:52 am	H. Swarthout	Village H	None
5/9/20	9:52-9:59 am	K. Merrill	Village H	None
5/14/20	10:04-10:17 am	H. Swarthout	Village H	None
5/16/20	8:11-8:21 am	K. Merrill	Village H	None
5/21/20	11:31-11:43 am	H. Swarthout	Village H	None
5/23/20	9:03-9:12 am	K. Merrill	Village H	None
5/28/20	11:20-11:32 am	H. Swarthout	Village H	None
5/30/20	9:29-9:35 am	K. Merrill	Village H	None
6/4/20	10:14-10:25 am	H. Swarthout	Village H	None

Date	Time (start-end)	Surveyor	Location	Species
6/6/20	9:12-9:21 am	K. Merrill	Village H	None
6/11/20	9:40-9:50 am	H. Swarthout	Village H	None
6/14/20	8:16-8:26 am	K. Merrill	Village H	None
6/18/20	9:56-10:02 am	H. Swarthout	Village H	None
6/20/20	9:31-9:40 am	K. Merrill	Village H	None
6/27/20	9:48-9:58 am	K. Merrill	Village H	None
7/2/20	2:39-2:48 pm	H. Swarthout	Village H	None
7/5/20	9:10-9:20 am	K. Merrill	Village H	None
7/9/20	10:28-10:38 am	H. Swarthout	Village H	None
7/11/20	9:56–10:07 am	K. Merrill	Village H	None
7/16/20	1:35-1:43 pm	H. Swarthout	Village H	None
7/18/20	9:43-9:53 am	K. Merrill	Village H	None
7/23/20	10:00-10:11 am	H. Swarthout	Village H	None
7/25/20	8:56-9:07 am	K. Merrill	Village H	Rabbit

Attachment C

Village H Representative Photographs of Wildlife Detected on Remote Wildlife Cameras

Opossum detected at VH5 Camera.

Bobcat detected at VH5 Camera.

Coyote detected at VH5 Camera.

Raccoon detected at VH5 Camera.

California ground squirrel detected at VH17 Camera.

Coyote detected at VH17 Camera.

Bobcat detected at VH17 Camera.

California quail detected at VH17 Camera.

California scrub jay detected at VH21 Camera.

Coyote detected at VH21 Camera.

Bobcat detected at VH21 Camera.

Raccoon detected at VH21 Camera.

Attachment D

Village H Dog Waste Studies
Representative Photographs

Collection from dog waste study on September 25, 2019.

Collection from dog waste study on October 8, 2019.

Collection from dog waste study on May 11, 2021.

Collection from dog waste study on June 10, 2021.

Collection from dog waste study on July 9, 2021.

Collection from dog waste study on August 6, 2021.

Collection from dog waste study on September 8, 2021.

Collection from dog waste study on October 6, 2021.

Collection from dog waste study on November 11, 2021.

Collection from dog waste study on December 21, 2021.

Collection from dog waste study on February 9, 2022.

Collection from dog waste study on March 9, 2022.

Collection from dog waste study on April 25, 2022.

Collection from dog waste study on May 19, 2022.

Collection from dog waste study on June 15, 2022.

Collection from dog waste study on July 15, 2022.

Collection from dog waste study on August 16, 2022.

Collection from dog waste study on September 22, 2022.

Collection from dog waste study on October 20, 2022.

Collection from dog waste study on November 17, 2022.

Collection from dog waste study on December 13, 2022.