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Harper Canyon Subdivision Project
Wildlife Camera Trapping Study Report

November 2023

Prepared for

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1. INTRODUCTION

Denise Duffy & Associates, Inc. (DD&A) was contracted by the County of Monterey Housing and Community Development Department (County) to conduct a wildlife camera trapping study for the proposed Harper Canyon Subdivision Project (proposed project), located in the County of Monterey (County) along Highway 68 and approximately five miles west of the City of Salinas (**Figure 1**). The proposed project involves a combined development permit for the subdivision of 344 acres into 17 residential lots for single-family homes (**Figure 2**). The proposed project site consists of rolling and undeveloped terrain, bordered on the east and south by Toro County Park and on the west by an existing housing subdivision within San Benancio Gulch. The Fort Ord National Monument (FONM) is located less than one mile north of the proposed project site, across Highway 68.

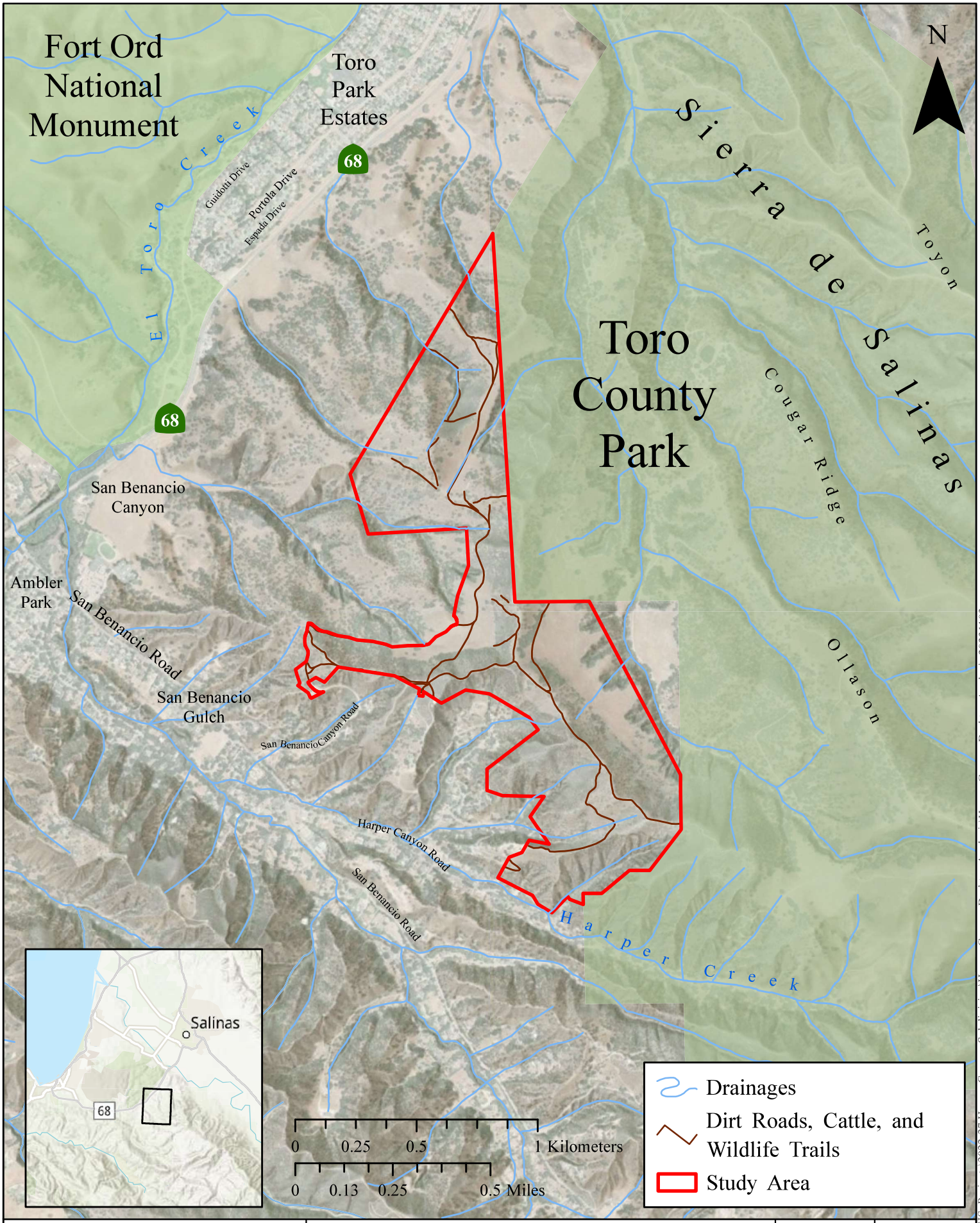
An Environmental Impact Report (EIR) was prepared for the project in December 2013 (State Clearinghouse No. 2003071157). The County served as the lead agency responsible for preparing the EIR. The Draft EIR noted that the proposed project site contained drainages, mostly tributaries to El Toro Creek, and that these channels "can provide movement corridors for amphibians when water is present and for other animals throughout the year." The Draft EIR also identifies larger wildlife, such as mountain lions and bobcats, as living in Monterey County. The Final EIR identifies wildlife corridors as a sensitive resource, and states that a substantial interference with such a corridor would constitute a significant impact. The proposed project is located less than a mile from a key wildlife passage (the Toro Creek Undercrossing) that allows wildlife to bypass Highway 68 (**Figure 3**). The courts determined that the Final EIR does not provide basic information about the wildlife corridor of which this passage is a part, such as its dimensions, or a definitive statement as to whether or not the corridor overlaps a portion of the proposed project site. The wildlife camera trapping study, conducted between December 2022 and May 2023, is an important step in the process of identifying and understanding the type and density of wildlife utilizing the proposed project site. This report describes the methods and results of the study.

2. STUDY AREA AND OBJECTIVES

The Study Area consists of the entire proposed project site (**Figure 1**), an approximately 343-acre area of rolling and undeveloped terrain, bordered on the east and south by Toro County Park, on the west by an existing housing subdivision within San Benancio Gulch, and to the northwest by private open space (proposed for the future Ferrini Ranch Subdivision development), Highway 68, and beyond that the FONM. Vegetative communities within the Study Area consist of annual grassland, coast live oak woodland and savanna, and chamise chaparral. Dirt roads, cattle trails, and wildlife trails are found throughout the Study Area, which is primarily used for livestock grazing. There are nine (9) unnamed drainages within the Study area that direct most surface water to two (2) intermittent creeks, El Toro Creek and Harper Creek. These creeks do not traverse the Study Area but are in the vicinity of the Study Area. El Toro Creek is an intermittent drainage located north of the Study Area that originates near the Laguna Seca Raceway and flows generally northeast on the north side of Highway 68 to the Salinas River. Harper Creek is an intermittent tributary of El Toro Creek located south and southwest of the Study Area that originates in the Sierre de Salinas Mountains just south of Toro County Park and generally flows northwest through the San Benancio Gulch. San Benancio Gulch is a regional identifier used to describe the lowlands between two ridges, that also conveys San Banacio Road. Four (4) of these drainages flow north toward Highway 68, Toro Park Estates, and El Toro Creek, although only one (1) of them appears to have a surface connection to El Toro Creek (USGS 2023). Four (4) of the drainages flow southwest toward San Benancio Gulch and

appear to have surface connection to Harper Creek (USGS 2023) during storm events. Two (2) drainages flow in a northeastern direction towards Toro County Park. The presence of surface water within drainages was not a parameter that was consistently documented as a part of this study.

The objective of this study is to develop a baseline inventory of wildlife usage throughout the Study Area.



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Harper Canyon Subdivision Project
Wildlife Camera Trapping Study Area

Date 11/3/2023
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Figure 1

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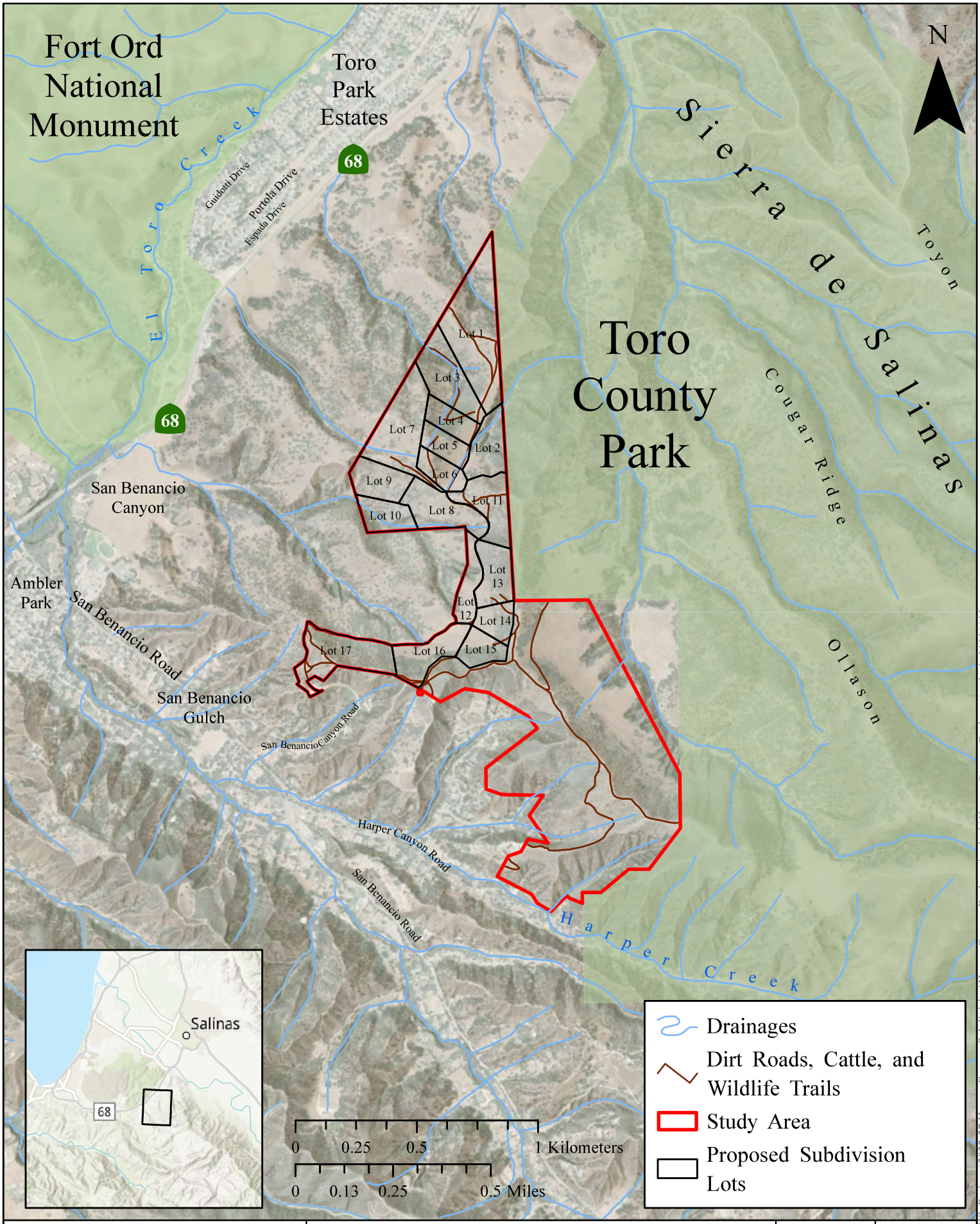

Denise Duffy & Associates, Inc.
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Harper Canyon Subdivision Project Site Plan

Date 11/3/2023

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Figure 2

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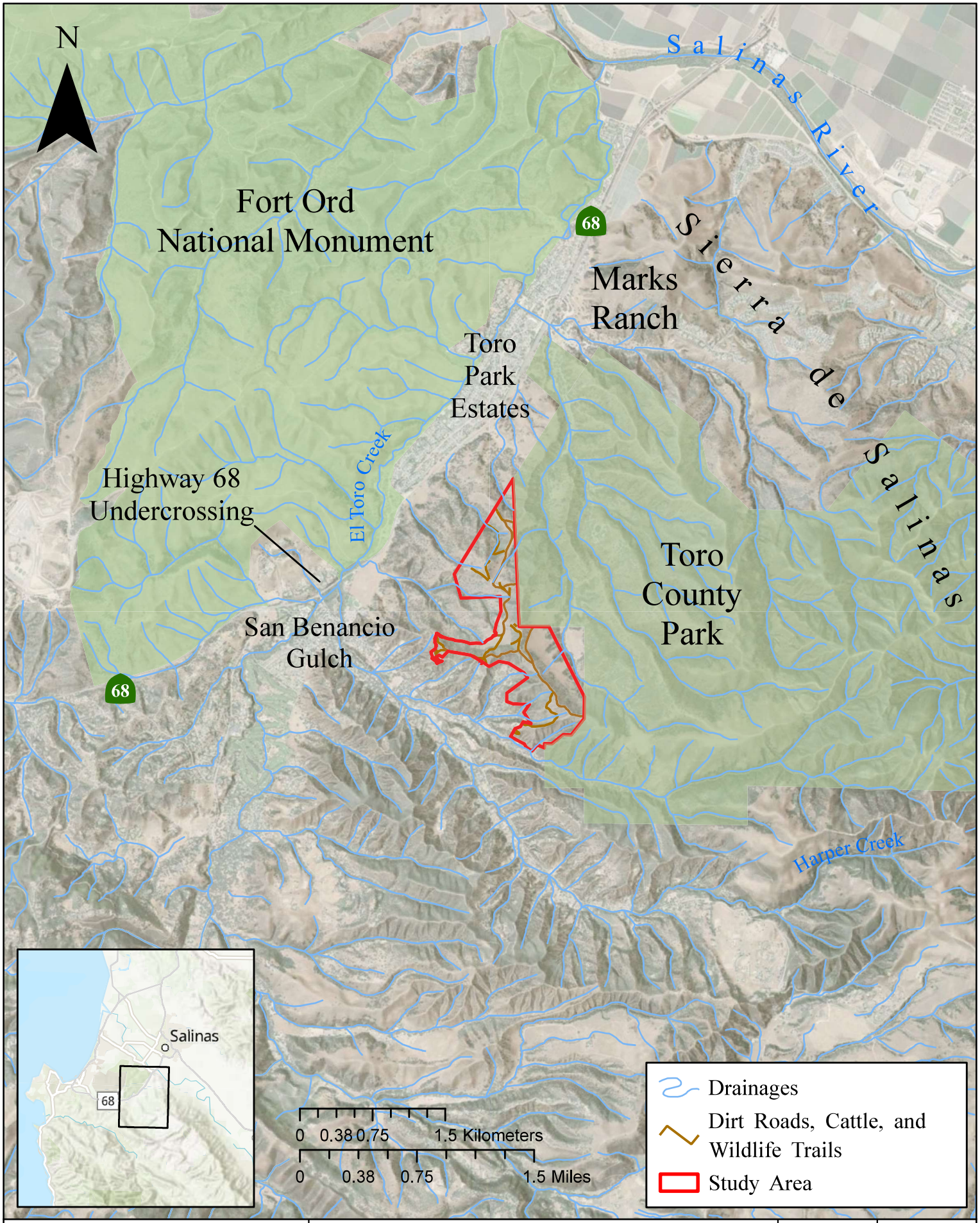

Denise Duffy & Associates, Inc. Planning and Environmental Consulting	Harper Canyon Subdivision Project Wildlife Camera Trapping Study Surrounding Area	Date 11/3/2023 Scale 1:50,000	Figure 3

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3. METHODS

3.1 Time Frame

The wildlife camera trapping study began on December 2, 2022, with the installation of six wildlife camera trapping stations (WCTS). WCTS were installed for a duration of six months, for a total of at least 1,080 camera trap days. Literature suggests that 1,000 camera trap days are sufficient for detecting 60-70% of the species within a Study Area (Tobler, et al., 2008; F. Rovero, et al., 2010). Data collection from the camera stations occurred on a bi-weekly basis.

3.2 Focal Species

This study centers on six focal species: mountain lion (*Puma concolor*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), black-tailed deer (*Odocoileus hemionus columbianus*), wild pig (*Sus scrofa*), and coyote (*Canis latrans*). Four of these species—mountain lion, gray fox, bobcat, and black-tailed deer—were chosen based upon their diversity of habitat requirements and movement patterns, which were documented in the Central Coast Connectivity Project (CCCP), a wildlife corridor study that analyzed wildlife movement patterns and identified lands and waterways that provide important connectivity between core habitat areas for wildlife between Central Coast mountain ranges (Connectivity for Wildlife, 2010). American badger (*Taxidea taxus*) and Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*) were also included as focal species in the CCCP; however, the study only captured each of these species once with WCTS. Given the infrequent observations of these species in the CCCP, this study replaces those focal species with wild pig and coyote, species that were documented using camera trapping stations in the CCCP, but were not included in the suite of focal species for that study.

3.3 Camera Trapping Station Location Determination

DD&A biologists reviewed applicable background documentation and data, including the State Route 68 Scenic Highway Plan (TAMC, 2017), the CCCP, *Biological Resource Assessment, Encina Hills Property, Monterey County, California* (Zander, 2001a), *Results of Follow-up Survey, Encina Hills Property, Monterey County, California* (Zander, 2001b), *Revised Biological Resource Assessment, Encina Hills Property, Monterey County, California* (Zander, 2005), the California Department of Fish and Wildlife's California Natural Diversity Database Biogeographic Information and Observation System, historical/current aerial photography/satellite imagery, topography, and other local sources. The review included a desktop geographic analysis of the Study Area using ESRI ArcGIS to determine the most likely locations for potential wildlife corridors/pathways and potential locations for WCTS. Potential WCTS locations were plotted on cartographic materials for use in the field installation component. Potential locations focused on entry and exit points to the Study Area, based on topographic features (e.g., drainages, existing trails and roads) and habitat types (e.g., riparian, grassland, oak woodland).

DD&A biologists traversed the Study Area with the cartographic materials described above to field-truth the potential locations for WCTS. The initial six camera trapping stations were placed at locations that showed some sign of wildlife activity (e.g., scat, trails, sign, burrows) or had topographic/habitat characteristics suggesting their use as a movement corridor (e.g., riparian drainages, wildlife trail, cattle trails, bedding areas). One camera was installed adjacent to a cave feature that had a wildlife sign (i.e., tracks) and could be used by wildlife as shelter (**Appendix A**, Photo 1).

Once WCTS locations were selected, equipment was placed with the intention to minimize effects on animal behavior. Camera setup also took into account the size of species that could be accommodated by

the area and passage being monitored, and WCTS locations were selected for both large-sized mammals and small-sized animals. According to Rovero et al. (2013), camera placement for faunal detection can be opportunistic (i.e., placed along intensively used wildlife trails, nests, feeding, or drinking sites) and the spatial arrangement of camera traps can be flexible; there are no strict requirements on minimum distances between camera traps or total Study Area to be covered. Tobler et al. (2008) indicated that the area covered by the camera traps may have little impact on the number of species detected; inventories may, therefore, be conducted in a sampling area that is representative of the total Study Area and main habitat types (e.g., dense forest, woodland, wooded grassland, grassland, etc.). Therefore, WCTS were placed along drainages, wildlife trails, and areas that provided shelter, in all of the vegetation communities within the Study Area.

During the study period WCTS were adjusted to study other locations or features within the Study Area. WCTS 4L1 was initially located within a drainage adjacent to a cave feature that could provide shelter for wildlife. One month into the study period this location did not result in any captures and the camera was relocated to a well-defined cattle/wildlife trail along a ridge heading leading north of the Study Area. WCTS 6L1 was relocated three times along various wildlife trails throughout the Study Area. Generally, camera locations that were producing low levels of success were relocated to new locations. Basing relocation on activity may lead to data bias; however, since the goal of the study was to establish a wildlife inventory, it was determined that locations with more activity were more important than the objectiveness of WCTS locations.

Locations for WCTS were recorded using survey-grade Trimble Geo7Series GPS collectors. GPS data collected was imported into ArcGIS for the development of cartographic materials. DD&A deployed six, motion-sensitive, infrared wildlife cameras at the locations identified below (Figure 4). Table 1 presents additional details on the camera locations, including duration of time at each station, surrounding topography, general location details, and generalized habitat characteristics.

Table 1. Wildlife Camera Location Details

Camera[1]	Dates Deployed	Surrounding Topography	General Location Details	Surrounding Habitat
1L1	12/2/2022-5/30/2023	Plateau	Study Area from San Benancio Gulch to the West, Adjacent to Dirt Road	Oak Woodland/ Savanna
2L1	12/2/2022-5/30/2023	Flat	Near Middle of Study Area, Along Dirt Road	Oak Woodland/ Grassland
3L1	12/2/2022-5/30/2023	Ridgeline	Connecting Trail from Toro Park to Southern End of the Study Area	Oak Woodland/ Scrub
4L1	12/2/2022-1/6/2023	Drainage	Along Drainage Heading North Toward Highway 68 and Toro Creek, Adjacent to Cave Feature	Oak Woodland/ Riparian
4L2	1/6/2023-5/30/2023	Ridgeline	North End of Study Area, Adjacent to Cattle Trail	Grassland
5L1	12/2/2022-5/30/2023	Drainage	Along Drainage Heading North Toward Highway 68 and Toro Creek	Oak Woodland/ Riparian

[1] Camera nomenclature represents the order in which the camera was deployed and the location. For example, Camera 4L2 was the fourth camera deployed during the initial deployment and the second location for Camera 4 after it was determined that the original location was not producing significant wildlife activity.

Camera[1]	Dates Deployed	Surrounding Topography	General Location Details	Surrounding Habitat
6L1	12/2/2022-1/6/2023	Ridgeline	Property Fenceline Trail Heading North to Highway 68 and Toro Creek	Oak Woodland/ Grassland
6L2	1/6/2023-2/10/2023	Hillside	Trail Heading West from Study Area into Toro Park	Oak Woodland/ Savanna
6L3	2/10/2023-4/30/2023	Ridgeline	Top of Trail Coming from San Benancio Gulch to the East	Oak Woodland/ Savanna
6L4	4/30/2023-5/30/2023	Hillside	Along Trail Heading Northwest to Highway 68	Oak Woodland/ Savanna

3.4 Cameras

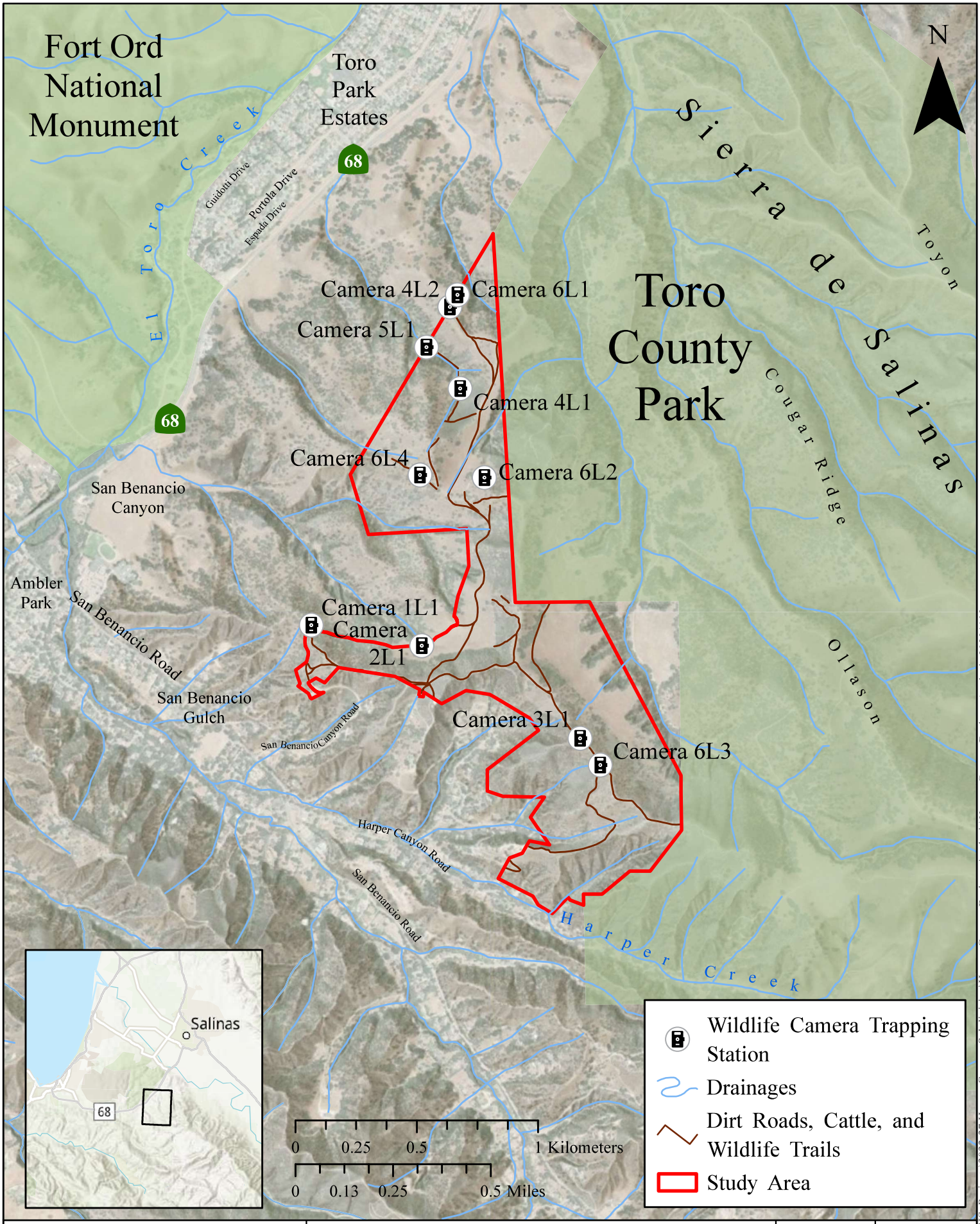
DD&A deployed six Bushnell Core DS No Glow Trail Cameras. CORE Dual Sensor (DS) Technology includes two image sensors, one optimized for sharper and richer images during the day and another optimized for images with consistent and further illumination at night. The camera provided an 80-foot range with minimal to no light emitted to produce photos at night. Table 2 details the camera settings that were used during the study. Photos from each station were downloaded directly from the SD cards to a laptop, where they were reviewed to confirm contents. Photos that did not contain wildlife (i.e., photos with humans, wind disturbance, etc.) were not included or categorized in the photo analysis. All photos containing wildlife were uploaded to Deer Lab (https://app.deerlab.com/), an online application used to categorize and organize wildlife camera photos. All wildlife in the photos were then tagged in the software to species level (if possible). Representative photos for each focal species and some unique species are included in Appendix A.

Table 2. Wildlife Camera Settings[2]

Mode	Image Size	Capture Number	Flash Mode	Interval	Sensor Level	Camera Mode	Time Stamp	Field Scan
Camera	30 MB	3	Long Range	10s	Auto	24 hrs.	On	Off

Mode: Selects the format your camera will record in.
Capture Number: Selects how many photos are taken in sequence per trigger.
Flash Mode: Selects the shutter speed.
Interval: Selects the length of time that the camera will "wait" until it responds to any additional triggers from the Passive Infra-Red Sensor.
Sensor Level: Auto sensor level will automatically adjust the sensor level depending on the surrounding temperature. >70°F (High); 45°F～70°F (Normal); < 45°F (Low).
Camera Mode: Allows user to limit operation to only day or night period if desired.
Time Stamp: Select "On" if you want the date & time (that the image was captured) imprinted on every photo/video, select "Off" for no imprint.
Field Scan: When set to "On", the Core Trail Camera will take a photo (or record a video clip) automatically at your choice of intervals (for example, once every five minutes) during one or two blocks of time you set up for each day, without requiring a trigger from an active animal.

[2] Settings for videos were not included since the trapping stations were set into camera mode.



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Harper Canyon Subdivision Project
Wildlife Camera Trapping Stations

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4. RESULTS AND DISCUSSION

The WCTS documented 2,422 instances of wildlife activity between December 20, 2022, and May 30, 2023. As discussed above, the focal species for this study were selected based on the CCCP and due to their diversity of habitat requirements and movement patterns; however, the suite of focal species was altered to include two species that were more consistently captured by WCTS in the CCCP (i.e., wild pig and coyote). A brief paragraph describing the activity of each focal species and as a discussion of other species observed during the study is presented below. Summarized results for each focal species are presented in Table 3.

Table 3. Focal Species Wildlife Camera Trap Results

Species	# of Tagged Photos	# of Sightings	Camera Locations
Bobcat	133	65	1L1, 2L1, 3L1, 4L2, 5L1, 6L3, 6L4
Coyote	226	120	1L1, 2L1, 3L1, 4L2, 5L1, 6L1
Fox	461	175	1L1, 2L1, 3L1, 6L3
Black-Tailed Deer	204	58	1L1, 2L1, 3L1, 4L2, 5L1, 6L1, 6L3
Mountain Lion	52	14	1L1, 2L1, 3L1, 5L1, 6L3
Wild Pig	148	26	1L1, 2L1, 3L1, 4L2, 5L1
Note: Photos taken within one 15-minute block of time were considered a sighting.			

4.1 Heat Maps

A Heat Map is a graphical representation of data that uses a system of color coding to represent different values. Heat Maps (Appendix B-1 through B-7) were created using the sightings collected at each WCTS to depict represent density of occurrences for wildlife. WCTS with several occurrences (dense) of a species are represented with red coloring while WCTS with few occurrences (sparse) are represented with yellow or green. A cumulative Heat Map was created to display wildlife occurrences for all focal species, as well as Heat Maps for each individual focal species. Heat Maps present a simple visual representation of locations within the Study Area that are frequented more regularly by each focal species and wildlife in general.

4.2 Focal Species

4.2.1 Bobcat

Bobcats were tagged in 133 photos for a total of 65 sightings within the Study Area. Most bobcat sightings occurred at night with approximately 35.3% occurring between the hours of 1800 and 2200. WCTS 1L1 and 3L1 were the most active stations for this species with 36.8% and 30.9% of the sightings. Bobcats were documented at seven (7) of the ten (10) WCTS. The Heat Map (Appendix B-1) suggests that the majority of bobcat activity occurred on the southern half of the Study Area moving between Toro County Park and San Benancio Gulch (Appendix A, Photos 2-4); however, bobcats were also documented traveling in and out of the Study Area on the northern boundary toward Highway 68 and the Toro Creek Undercrossing (Appendix A, Photos 5-6).

4.2.2 Coyote

Coyotes were tagged in 226 photos for a total of 120 sightings within the Study Area. Coyote sightings were split almost equally between day and night with the majority (23.3%) occurring between the hours of 1800 and 2200. WCTS 1L1 and 2L1 were the most active stations for this species with 37.5% and 35.8%

of the sightings. Coyotes were documented at six (6) of the ten (10) WCTS. The Heat Map (Appendix B-2) suggests a concentration of coyote activity near the entrance to the Study Area on the west side of San Benancio Gulch (Appendix A, Photos 7-8). Coyotes were also documented traveling in and out of the northern and southern boundaries of the Study Area (Appendix A, Photos 9-10).

4.2.3 Fox

Foxes were the most dominant focal species documented within the Study Area with 461 tagged photos, for a total of 175 sightings within the Study Area. The large majority (97.1%) of documented fox activity occurred at night with approximately 41.1% occurring between the hours of 1800 and 2200. WCTS 3L1 was the most active station for this species with 59.4%. Foxes were documented at four (4) of the ten (10) WCTS. The Heat Map (Appendix B-3) shows that most foxes were documented along the ridgeline that travels north/south through the southern end of the Study Area. Although foxes were photographed the most, when compared to the other focal species, they were also the species with the smallest range within the Study Area. Foxes were not documented on the northern half of the Study Area.

4.2.4 Black-Tailed Deer

Black-tailed deer were tagged in 204 photos for a total of 58 sightings within the Study Area. Most black-tailed deer sightings occurred during the day with approximately 43.1% occurring between the hours of 0600 and 1000. Black-tailed deer were documented at seven (7) of the ten (10) WCTS and distributed relatively evenly throughout the Study Area (Appendix B-4); however, WCTS 1L1 (Appendix A, Photo 11) and 4L2 (Appendix A, Photo 12) were the most active stations for this species with 43.1% and 20.7% of the sightings, respectively.

4.2.5 Mountain Lion

Mountain lions were tagged in 52 photos for a total of 14 sightings within the Study Area. All mountain lion sightings occurred at night with approximately 35.7% occurring between the hours of 0200 and 0600. Camera stations 3L1 and 5L1 were the most active stations for this species with 35.7% and 28.6% of the sightings. Mountain lions were documented at five (5) of the ten (10) camera trapping stations. The Heat Map (Appendix B-5) shows that mountain lions were more active on the southern and northern portions of the Study Area.

Given the sparse number sightings and their importance in the context of macro scale wildlife corridors, a detailed accounting of mountain lion activity is presented below. The first mountain lion was captured on WCTS 3L1 on December 5, 2022, at 0511 (Appendix A, Photo 13). On December 8, 2022, at 1844 hours, two mountain lions were photographed moving south to north along the ridgeline in the southern half of the Study Area (Appendix A, Photo 14). One of the pair was documented marking territory near the WCTS (Appendix A, Photo 3). At the same WCTS, mountain lions were captured moving south toward Toro County Park on March 18 (Appendix A, Photo 16) and April 12, 2023 (Appendix A, Photo 17). Two mountain lions were also documented using the drainage on the northern end of the Study Area by WCTS 5L1 (Appendix A, Photo 18). A single mountain lion was documented at WCTS 5L1 on March 17, 2023, at 2031 hours (Appendix A, Photo 19). On February 10, 2023, a mountain lion was captured by WCTS 6L3 heading north into the Study Area from the San Benancio Gulch area (Appendix A, Photo 20).

4.2.6 Wild Pig

Wild pigs were tagged in 148 photos for a total of 26 sightings within the Study Area. Most wild pig sightings occurred at night with 26.9% occurring between the hours of 2200 and 0600. WCTS 2L1 and 5L1

were the most active stations for this species with 30.8% and 26.9% of the sightings, respectively. Wild pigs were documented at five (5) of the ten (10) WCTS distributed relatively evenly between the WCTS (Appendix B-6). Wild pigs with piglets were documented at WCTS 5L1 on April 25, May 9, and May 13, 2023 (Appendix A, Photo 21).

4.2.7 All Focal Species

All focal species were tagged in 1,224 photos for a total of 458 sightings within the Study Area. Most focal species sightings occurred at night with 69.9% occurring between the hours of 1800 and 0600. WCTS 3L1 and 1L1 were the most active stations for all focal species with 31.6% and 31.0% of the sightings, respectively. Focal species were documented at eight (8) of the ten (10) WCTS (Appendix B-7).

4.2.8 Non-Focal Species

In addition to the focal species that were captured during the study, several other wildlife species were documented within the Study Area. Other wildlife species included American badger (Appendix A, Photo 22), American kestrel (*Falco sparverius*), mouse[3], owl, California quail (*Callipepla californica*), California scrub jay (*Aphelocoma californica*), rabbit, greater roadrunner (*Geococcyx californianus*; Appendix A, Photo 23), striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale gracilis*; Appendix A, Photo 24), spotted towhee (*Pipilo maculatus*), turkey vulture (*Cathartes aura*), wild turkey (*Meleagris gallopavo*), western bluebird (*Sialia mexicanus*), western meadowlark (*Sturnella neglecta*), and several bird species that could not be identified to the species level.

5. CONCLUSION

The study captured 21 species of wildlife that could be identified to species,[4] including the six focal species, utilizing varying movement corridors and habitats within the Study Area. In addition, the study documented various rodent and avian individuals that could not be identified or differentiated from other species. Wildlife activity captured during this study suggests that the Study Area provides suitable habitat and movement corridors for all the focal species, as well as for various other wildlife species.

The documented wildlife activity also suggests that five out of the six focal species are traveling through the Study Area to access adjacent large contiguous undeveloped lands (Toro County Park and FONM). For example, the study documented a pair of mountain lions entering the Study Area along a trail that originates in the southwestern quadrant ofToro County Park (WCTS 3L1, Appendix A, Photo 14). A pair of mountain lions were also documented (WCTS 5L1)[5] leaving the Study Area via a game trail located adjacent to a drainage on the northern boundary of the Study Area on December 12, 2022, at 1732 hours, and then documented returning past the same WCTS on December 13, 2022, at 0241 hours (Appendix A, Photo 18). This occurrence suggests that the focal species, including mountain lions and deer, are traveling through the Study Area to access the contiguous undeveloped lands located north and south of the Study Area (i.e., FONM, the Sierra de Salinas Mountain Range, Toro County Park, etc.). The one exception within the suite of focal species was gray fox, which was documented traveling on a relatively localized scale. Gray fox was only documented at four WCTS (1L1, 2L1, 3L1, 6L3), all located within the southern half of the Study

[3] Wildlife captured that are presented without scientific names were not able to be categorized to the species level due to the quality of the photo documentation.
[4] Some species were not able to be identified or differentiated from other species.
[5] The pair was not captured in a single photo but in two consecutive photos of one sighting.

Area. However, given that the estimated home range for this species varies from 75 hectares (ha) (185 acres) (Yearsley and Samuel, 1984) to 757 ha (1,870 acres) (Haroldson and Fritzell, 1980), it is probable that gray foxes documented during this study were also traveling outside of the boundaries of the Study Area to access the undeveloped lands adjacent to the Study Area.

The Heat Map for all focal species shows that wildlife activity is the densest within Lots 16 and 17 along the main thoroughfare (Appendix B-7). This existing dirt road, along with the arterial dirt road that traverses the ridgeline from Lot 15 and 16 to the Remainder Parcel provide a convenient movement corridor for wildlife from Toro County Park to the San Benancio Gulch area, and eventually to the FONM though the Highway 68 undercrossing at El Toro Creek. Development of these roads and increased traffic could result in impacts to wildlife currently using them as movement corridors. Providing alternative corridors outside of the single-family residence and infrastructure development envelopes by limiting access to existing cattle paths and other wildlife trails could help to lessen this impact. Wildlife activity was also dense within the drainage that bifurcates Lot 3 running from southeast to northwest. Water was observed throughout the duration of the study period and the coast live oak tree canopy provides habitat and cover for several wildlife species. Setbacks from this drainage are recommended to lessen any potential impacts and continued use by wildlife moving through the Study Area. Best Management Practices have been developed for wildlife corridors (Beier et al. 2008) and should be considered including:

- Minimize impacts of outdoor night lighting by regulating brightness, shielding, light direction, etc.
- Prohibit intentional planting of invasive plants.
- Provide crossing structures on all thoroughfares and maintain them for access.
- Maintain or improve native riparian vegetation.
- Encourage small building footprints on large (> 40 acre) parcels with a minimal road network.
- Combine habitat conservation with compatible public goals such as recreation and protection of water quality.
- Develop a public education campaign to inform those living and working within the linkage area about living with wildlife, and the importance of maintaining ecological connectivity.
- Discourage residents and visitors from feeding or providing water for wild mammals, or otherwise allowing wildlife to lose their fear of people.
- Install wildlife-proof trash and recycling receptacles and encourage people to store their garbage securely.
- Do not install artificial night lighting on rural roads that pass through the linkage design. Reduce vehicle traffic speeds in sensitive locations by speed bumps, curves, artificial constrictions, and other traffic calming devices.
- Encourage the use of wildlife-friendly fencing on property and pasture boundaries, and wildlife-proof fencing around gardens and other potential wildlife attractants.
- Discourage the killing of 'threat' species such as rattlesnakes.
- Reduce or restrict the use of pesticides, insecticides, herbicides, and rodenticides, and educate the public about the effects these chemicals have throughout the ecosystem.

As stated, this study is an important step in the process of identifying and understanding the type and density of wildlife utilizing the Study Area. While this study was able to establish that several species of wildlife are existing and traveling through the Study Area, the subjective placement of the cameras limit the degree of statistical analysis that can be performed on the data collected. Additionally, redistribution of WCTS based upon level of activity introduces bias to the dataset that must be acknowledged. Camera placement

strategy using a more systematic and objective approach would allow for more meaningful statistical analysis in potential topics such as species richness, density, and abundance based on specific habitat type or topographic features. Additional evaluation of the photographs could also be performed to identify individual wildlife to track their particular movement throughout the Study Area.

The objective of this study was to develop a baseline inventory of wildlife usage throughout the Study Area. By placing WCTS throughout the Study Area for a period of 6 months DD&A was able to document more than 20 different wildlife species utilizing the Study Area. While additional study methodologies suggested above can be employed in the future to refine wildlife movement and usage, this study has determined that there is robust wildlife usage within the Study Area.

6. REFERENCES

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Appendix A. Wildlife Camera Trapping Station Photographs

Photo 1. Cave feature located adjacent to WCTS 4L1.

Photo 2. Bobcat sighting at WCTS 2L1 on March 27, 2023 at 1749 hours traveling west along trail toward San Benancio Gulch.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 3. Bobcat sighting at WCTS 3L1 on April 8, 2023 at 1115 hours traveling along trail from south to north, toward San Benancio Gulch.

Photo 4. Bobcat sighting at WCTS 4L2 on January 31, 2023 at 1638 hours entering the Study Area from the Highway 68.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 5. Bobcat sighting at WCTS 6L4 on May 6, 2023 at 0802 heading northwest out of the Study Area toward Highway 68.

Photo 6. Bobcat sighting at WCTS 6L4 on May 20, 2023 at 0700 hours heading southeast into the Study Area from Highway 68.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 7. Two coyotes at WCTS 1L1 on January 24, 2023 at 2256 hours heading west from Study Area toward San Benancio Gulch.

Photo 8. Coyote sighting at WCTS 1L1 on January 13, 2023 at 0832 hours heading east from San Benancio Gulch. Coyote is sniffing area that was marked by several other coyotes.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 9. Coyote sighting at WCTS 3L1 on December 7, 2022 at 1504 hours heading south toward Toro Park area.

Photo 10. Coyote sighting at WCTS 5L1 on May 4, 2023 at 1032 hours moving along drainage path heading north toward Highway 68.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 11. Black-tailed deer sighting at WCTS 1L1 on April 18, 2023 at 0908 hours traveling east into the Study Area from the San Benancio Gulch.

Photo 12. Black-tailed deer sighting at WCTS 4L2 on January 20, 2023 at 0424 hours traveling south into the study area from Highway 68.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 13. Mountain lion at WCTS 3L1 on December 6, 2023 at 0511 hours traveling north into the study area from the Toro Park area.

Photo 14. Two mountain lions at WCTS 3L1 on December 8, 2023 at 1844 hours traveling north into the study area from the Toro Park area.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 15. Mountain lion at WCTS 3L1 captured marking territory.

Photo 16. Mountain lion at WCTS 3L1 on March 18, 2023 at 0409 hours traveling south from study area into Toro Park area.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 17. Mountain lion at WCTS 3L1 on April 12, 2023 at 2147 hours traveling south from study area into Toro Park area.

Photo 18. Two mountain lions at WCTS 5L1 on December 13, 2022 at 0241 hours traveling south along a drainage from the Highway 68 into the study area.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 19. Mountain lion at WCTS 5L1 on March 17, 2023 at 2031 hours traveling north toward Highway 68.

Photo 20. Mountain lion at WCTS 6L3 on February 10, 2023 at 2208 hours traveling north toward study area from the San Benancio Gulch area.

Appendix A. Wildlife Camera Trapping Station Photos

Photo 21. Wild pigs with piglets at WCTS 5L1 on April 25 at 1859 hours, traveling along a drainage heading north toward Highway 68.

Photo 22. American badger at WCTS 3L1 on May 6, 2023 at 0010 hours traveling north toward study area from the Toro Park area.

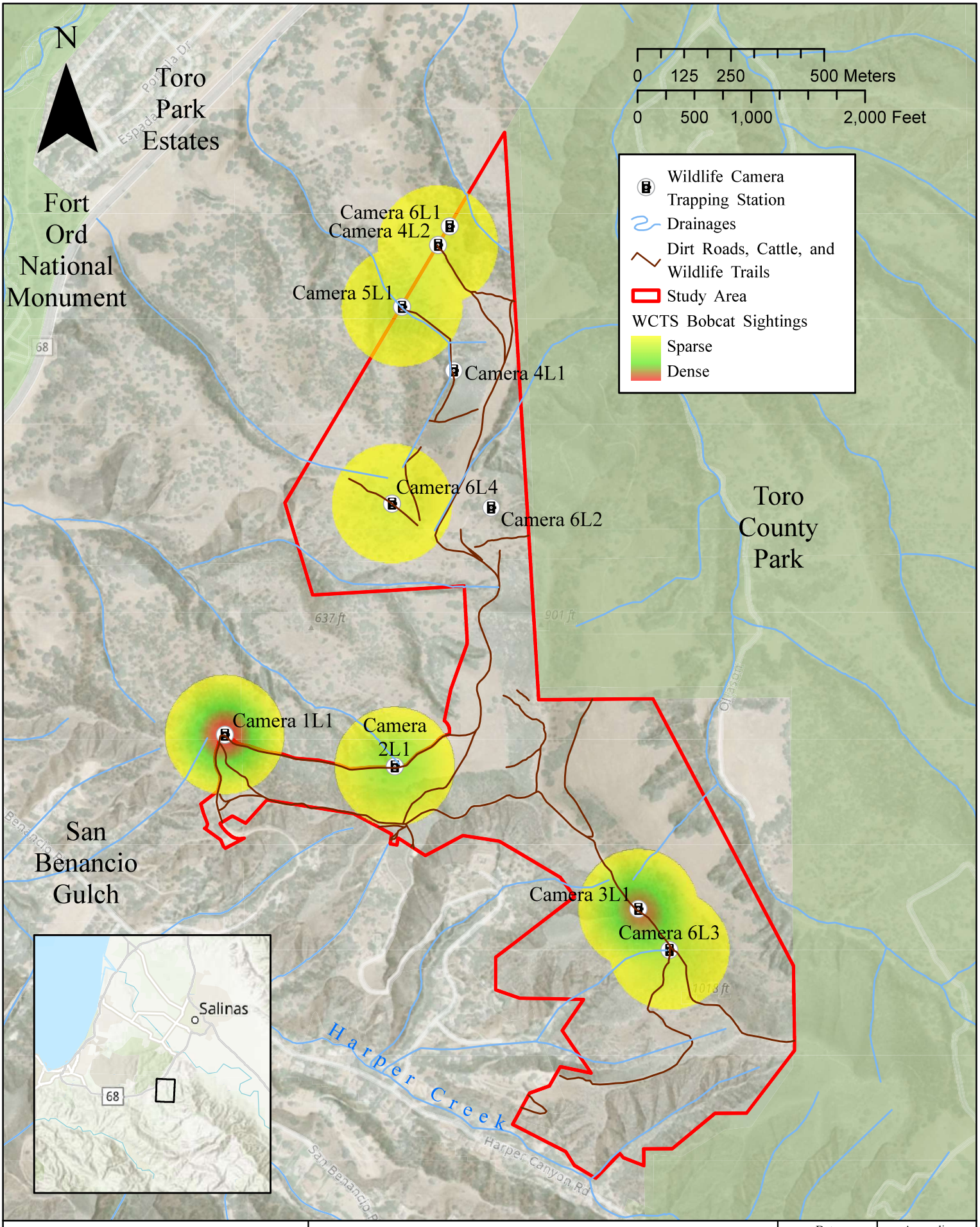
Appendix A. Wildlife Camera Trapping Station Photos

Photo 23. Greater roadrunner at WCTS 3L1 on March 5, 2023 at 1559 hours.

Photo 24. Spotted skunk at WCTS 3L1 on May 14, 2023 at 2205 hours traveling south toward the Toro Park area.

Appendix A. Wildlife Camera Trapping Station Photos

Appendix B. Heat Maps



Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study Bobcat Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Appendix B-1

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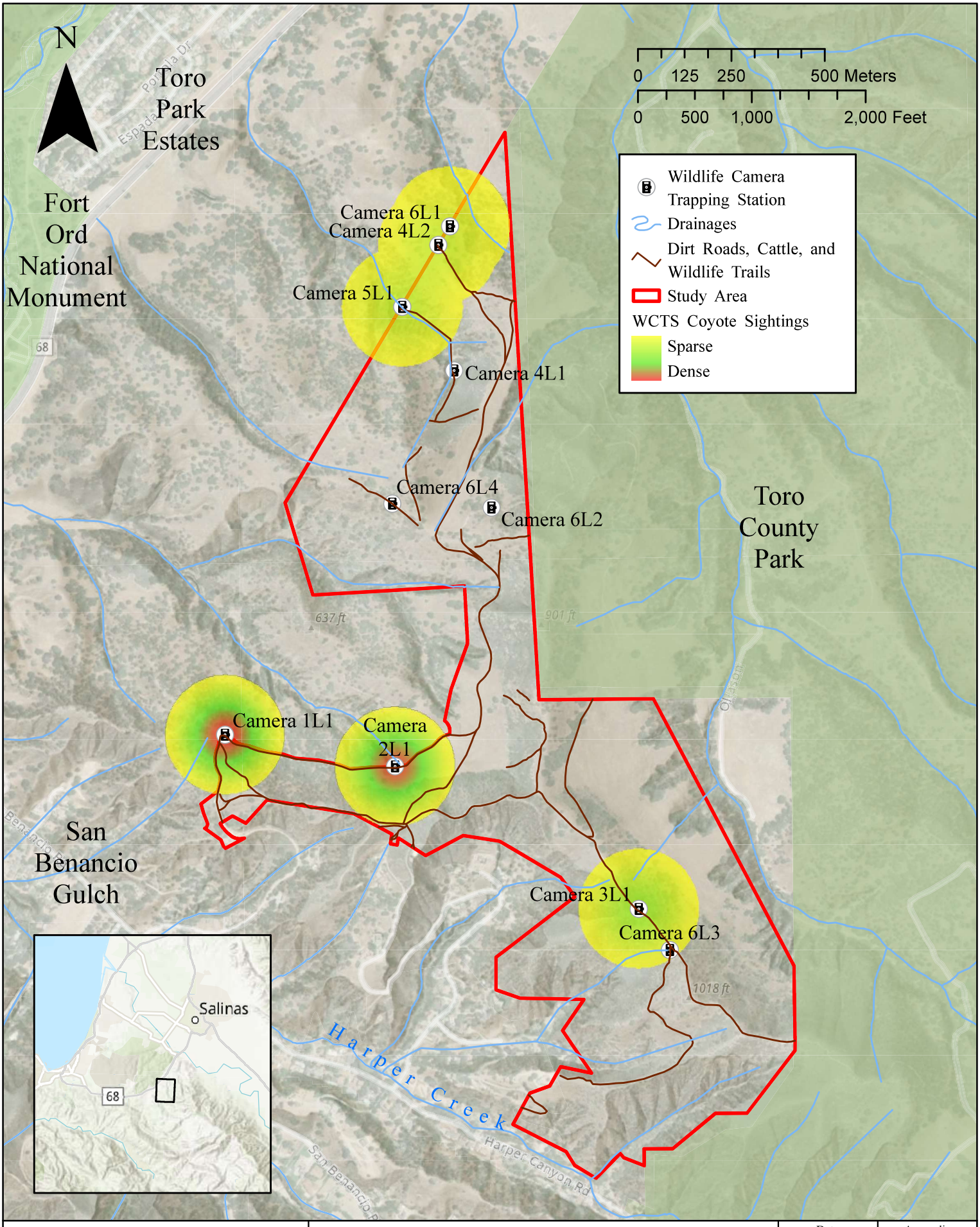

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study Coyote Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Appendix B-2

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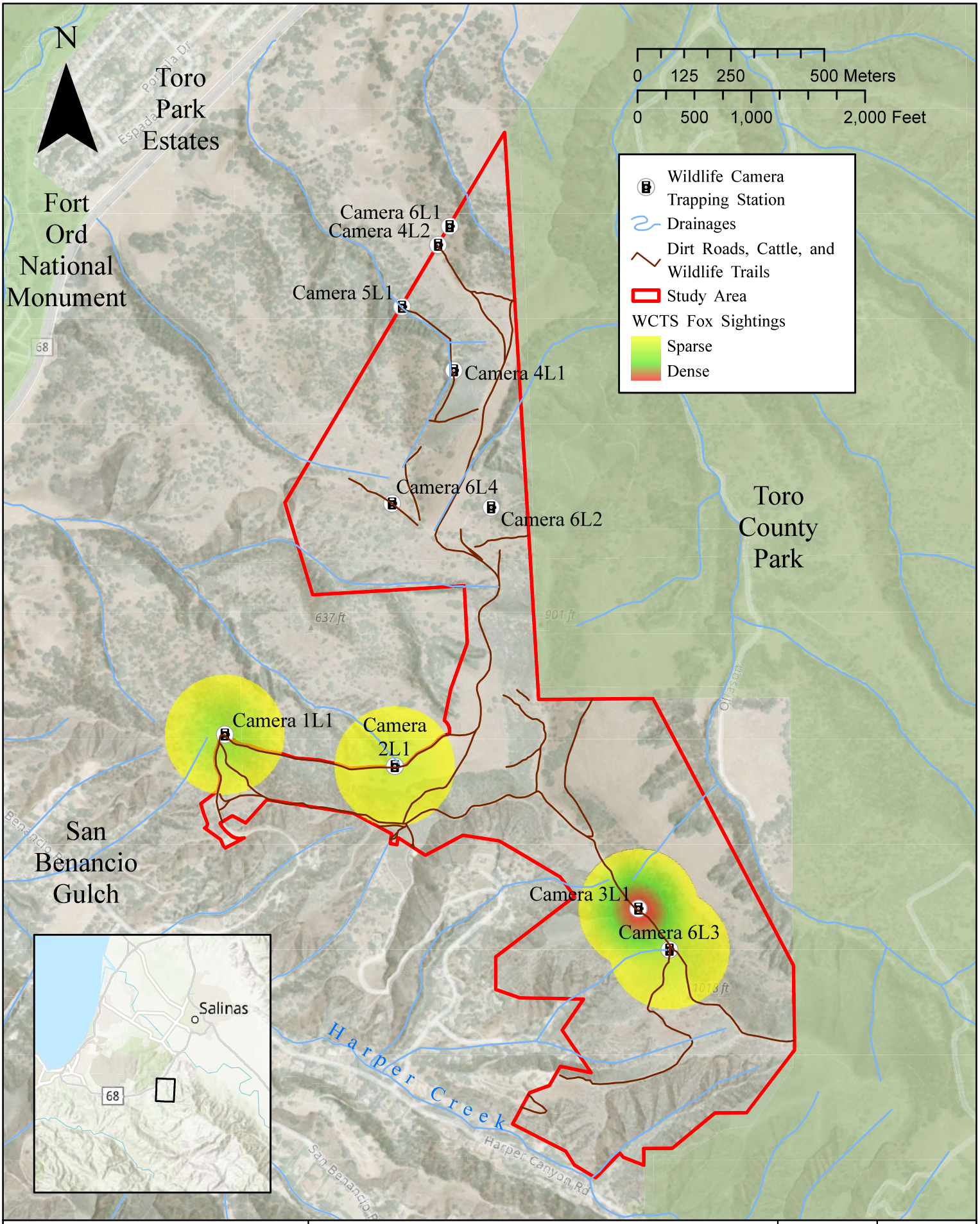

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study Fox Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Appendix B-3

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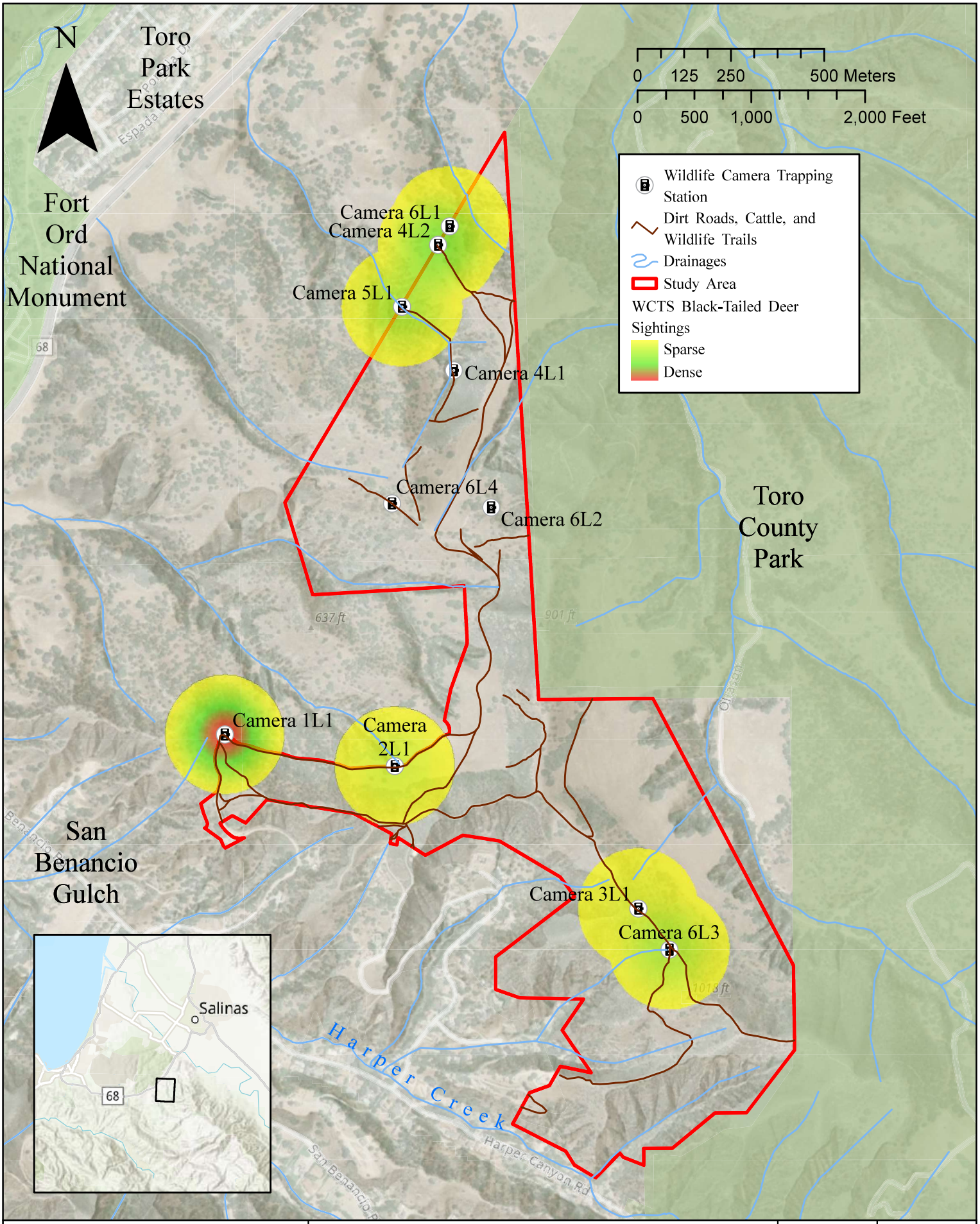

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study Black-Tailed Deer Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Appendix B-4

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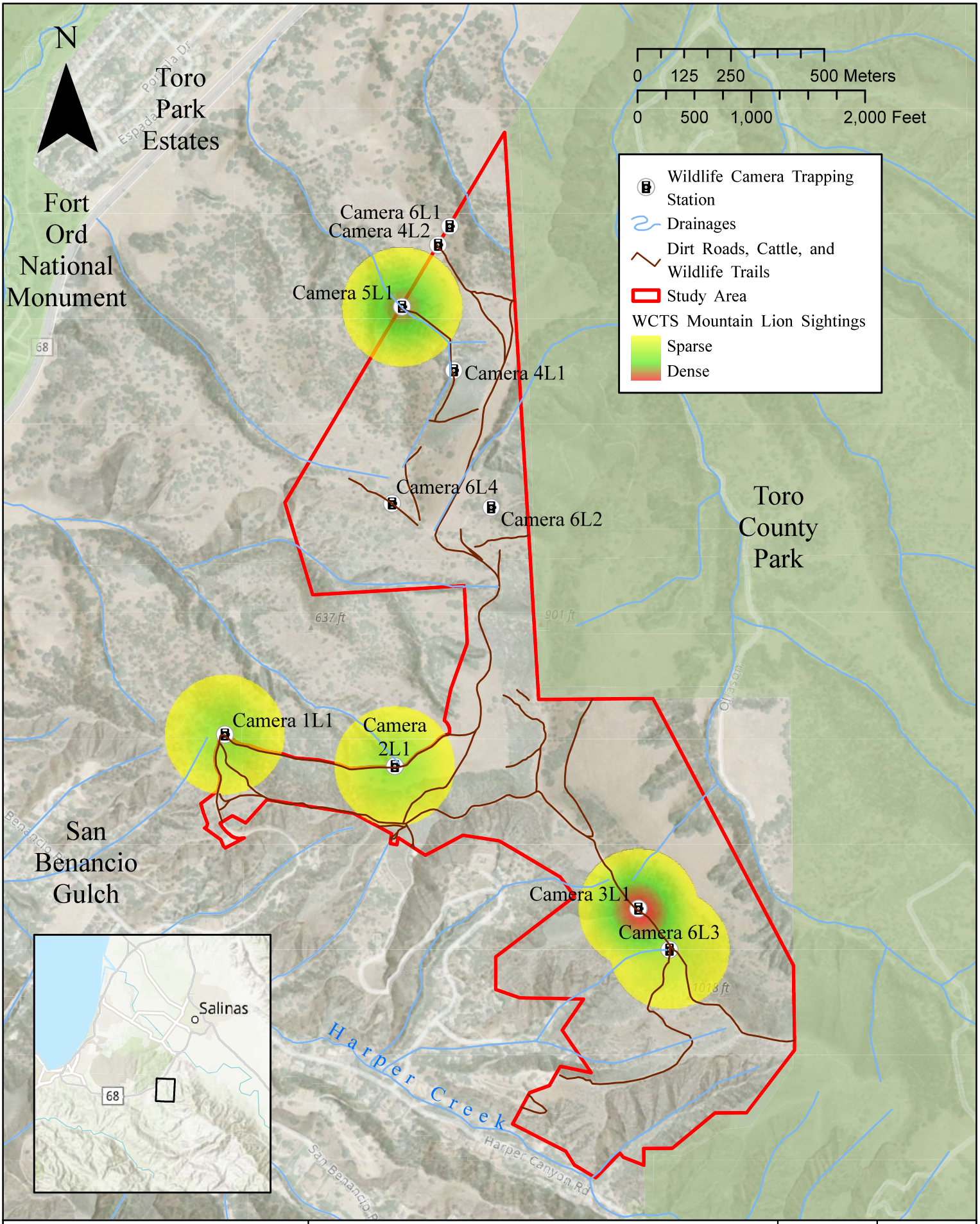

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study Mountain Lion Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Appendix B-5

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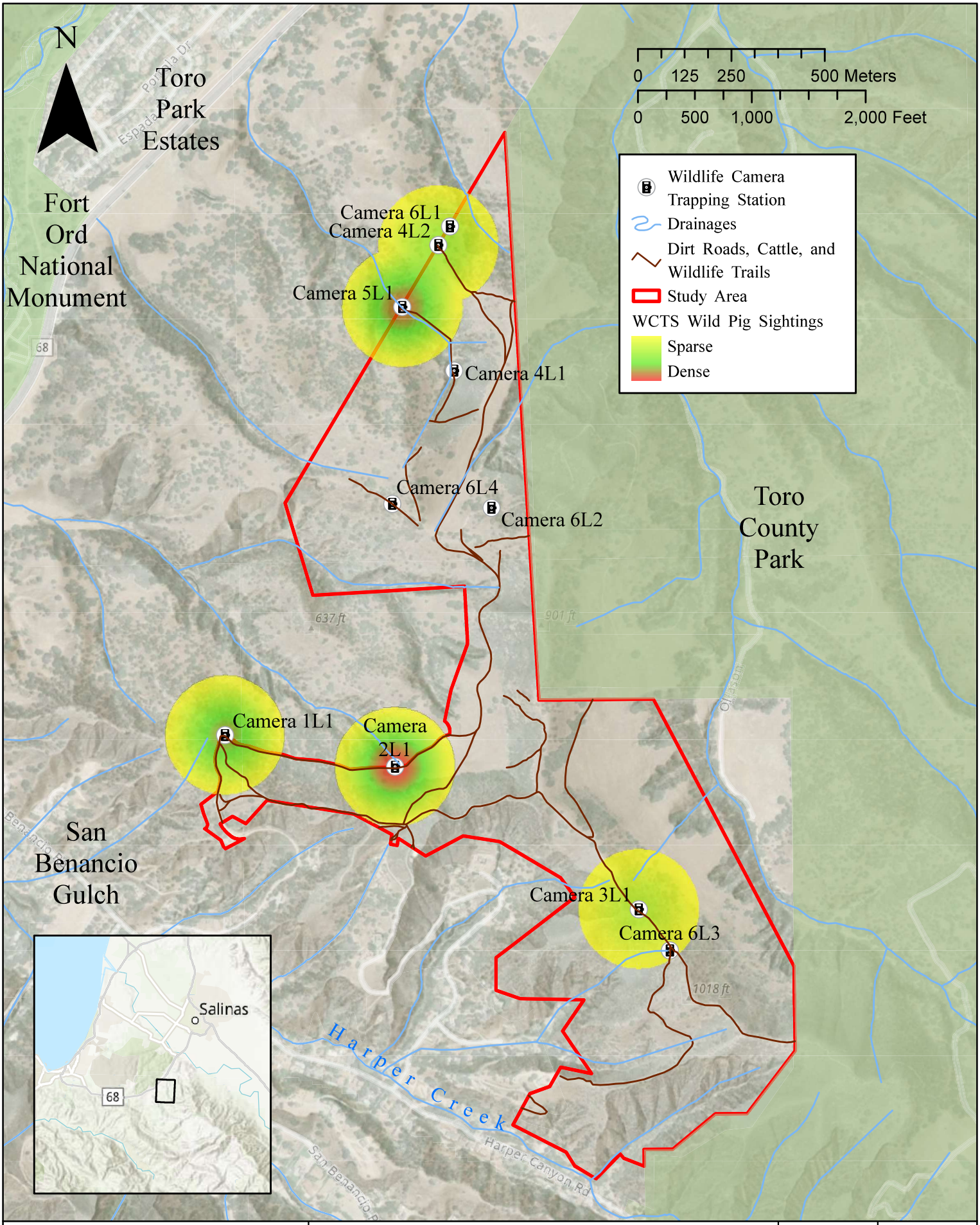

Denise Duffy & Associates, Inc. Planning and Environmental Consulting	Harper Canyon Subdivision Project Wildlife Camera Trapping Study Wild Boar Sighting Heat Map	Date 11/3/2023 Scale 1:13,000	Appendix B-6

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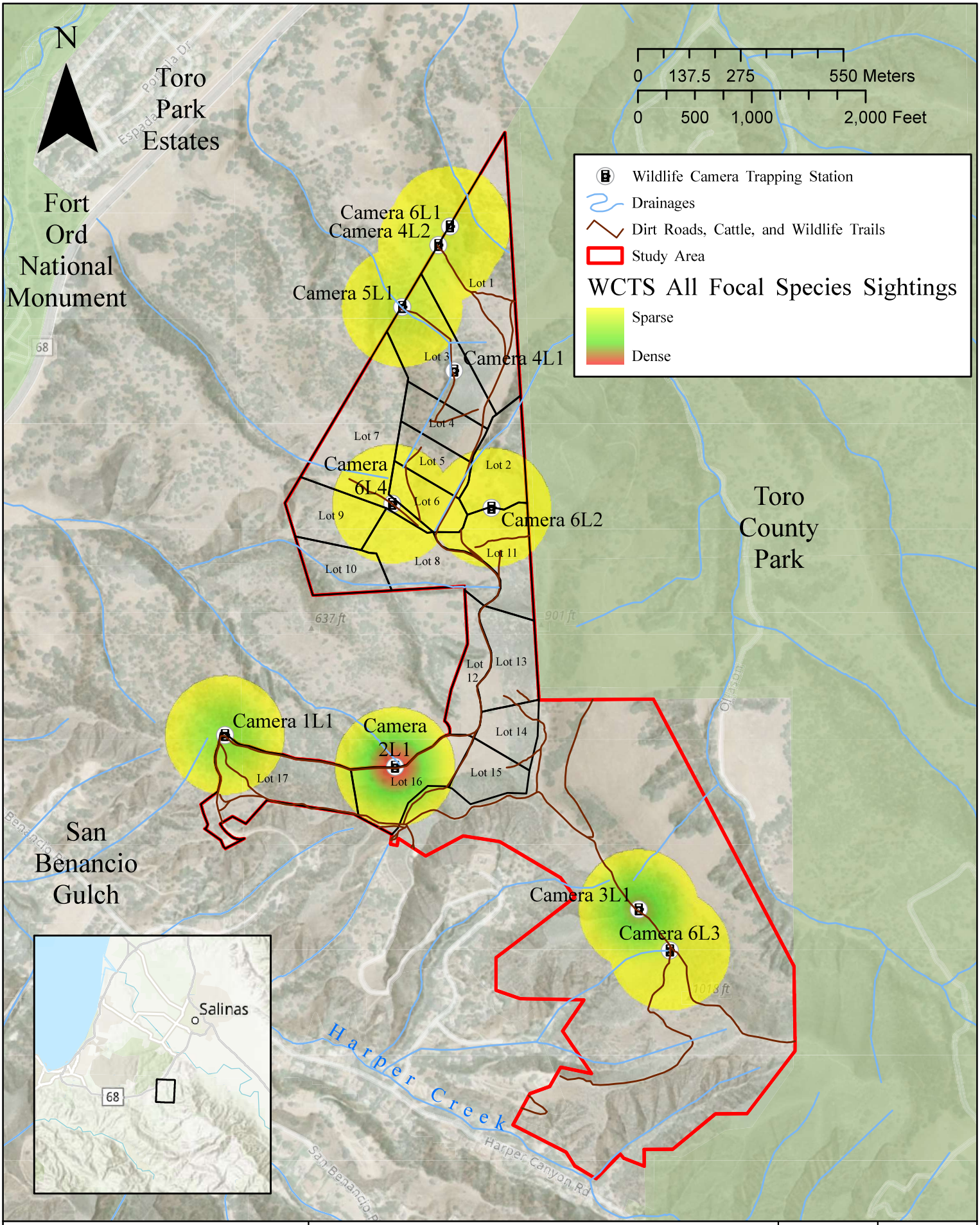

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Harper Canyon Subdivision Project Wildlife Camera Trapping Study All Focal Species Sighting Heat Map

Date 11/3/2023

Scale 1:13,000

Figure B-7

Path: F:\GIS\GIS_Projects\2022-27 Harper Canyon Subdivision\Harper Canyon Desktop Analysis\Harper Canyon Desktop Analysis 20231103.aprx