

**STEPHENS' KANGAROO RAT (*Dipodomys stephensi*)
FOCUSED SURVEY REPORT
FOR THE SAN DIEGO GAS & ELECTRIC
CLEVELAND NATIONAL FOREST
MASTER SERVICES PERMIT PROJECT
SAN DIEGO COUNTY, CALIFORNIA**

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SECTION 1.0 – INTRODUCTION

1.1 PROJECT DESCRIPTION

The Cleveland National Forest (CNF) is requesting an Environmental Impact Statement (EIS) be prepared for the issuance of a Master Special Use Permit to the San Diego Gas & Electric Company (SDG&E). The Master Special Use Permit would cover the operations and maintenance of the existing electric distribution and transmission lines, appropriate access roads, and facilities within the Trabuco, Palomar, and Descanso Ranger Districts of the CNF. The existing facilities are needed to supply power to local communities, residents, and government-owned facilities located within and adjacent to the CNF. The CNF is also analyzing operational and equipment upgrades and improvements to the existing lines. The Master Special Use Permit would also include conditions necessary for resource protection. Chambers Group, Inc (Chambers Group) has conducted biological surveys including focused sensitive wildlife species surveys and focused surveys for rare plants along the distribution and transmission line Rights of Way (ROW) within the CNF (Project Area¹). The survey results will be submitted by SDG&E to the CNF in support of the EIS to help analyze potential impacts to sensitive species within the Project Area. The Project Area includes approximately 167 linear miles of 12 transmission and distribution lines and includes the associated access roads and work areas. In addition to the data gathered from the Chambers Group surveys, the United States Forest Service (USFS) Biological Assessment/Biological Evaluation (BA/BE) for the CNF will be used to support this effort and report analysis.

At the request of Chambers Group, Inc., SJM Biological Consultants, Inc. (SJMBC) conducted a field survey for the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*; SKR) in the Project Area. The Survey Area (see below) covers an extensive range of terrain and habitat types, from the area of Lake Henshaw in the north to the area of Campo in the south near the Mexican border. The objective of this study was to determine the presence/absence of SKR within the Project Area.

1.2 SURVEY AREA

The identified Survey Areas were a 150-foot buffer around transmission/distribution pole centerlines and was extended to a 250-foot radius around each pole where the overhead line makes an angle greater than 2 degrees. The additional buffer is to include potential additional work space that is typically required during operation and maintenance work at angle points within the overhead lines.

SJMBC conducted habitat assessment surveys for SKR within the Project Area. Survey Areas were identified first by geographical locations within the county and were also referenced by the associated transmission/distribution line. These areas were then further refined to individual drainages that were surveyed and were graphically depicted on an accompanying aerial mapbook. One master mapbook was created for the entire Project Area; however, due to its size only the relevant mapbook pages are included in this report. Appendix A contains maps showing the SKR Survey Areas.

The Cleveland National Forest Project Area traverses many miles of land exhibiting numerous topographical, substrate and habitat regimes. In general, however, much of the alignment crosses very

¹ A complete Mapbook and description of the entire Project Area can be submitted upon request.

rugged and often steep rocky terrain that is unsuitable for SKR. Vegetation types in the Project Area range from grasslands to chaparral, sage scrub, and both oak and riparian woodlands. Habitats considered to be potentially occupied by SKR consist of the larger more robust stands of grassland in this region, or possibly multiple interconnected smaller grasslands. Most sizable grasslands in the project area are surrounded by very rugged terrain covered in dense chaparral/scrub vegetation. This is true in both southern and northern parts of the Project Area, with the exception of the expansive level to gently rolling grasslands north and east of Lake Henshaw.

1.3 SKR DISTRIBUTION AND LIFE HISTORY

The Stephens' kangaroo rat is known to occur widely in Riverside County, and its distribution in that county is generally well known (RCHCA 1995). However, the distribution of SKR and information regarding its populations in San Diego County are less well documented. Stephens' kangaroo rats are known to presently inhabit or to have historically inhabited several widely scattered localities in San Diego County, including: Camp Pendleton Marine Corps Base and adjacent parts of Oceanside; Fallbrook Naval Weapons Station and nearby lands adjacent to the San Luis Rey River; the general grassland region encompassing Lake Henshaw and Warner Springs; Guejito Ranch east of Escondido; and the area adjacent to and in close proximity to the Ramona Airport (Lackey 1967; Montgomery 2005, 1992, 1990; Montgomery et al. 1996/97; O'Farrell et al. 1989, 1987, 1986; Ogden 1998; PSBS 1977; SJM Biological Consultants 2005; Thomas 1975, 1973; USFWS 1997, 1993).

Perhaps the largest known contiguous population of SKR in either Riverside or San Diego Counties occurs in the grassland habitats north and east of Lake Henshaw, in the interior portion of San Diego County. This population was originally described by O'Farrell et al. (1987, 1986) and at one time apparently encompassed several thousands of acres. A follow-up survey of lands covered in the original study in this area (O'Farrell 1987) indicated that the area of occupied SKR habitat had decreased by approximately 90 percent by 1990 due to reduced cattle grazing (O'Farrell and Uptain, unpublished data). No more recent field studies have determined the current status of this entire population. However, observations by S. Montgomery in the grasslands adjacent to the west side of SR79 (personal observation), in the extensive grasslands east of SR79 (Montgomery 2007), and at the far northern end of the Lake Henshaw grassland (Montgomery 2006), did confirm that extensive acreages of occupied habitat still persist in this region. Furthermore, the field survey at the northern end of the Lake Henshaw grassland ecosystem clearly confirmed that grazing (in this specific case, cattle grazing) is the primary force maintaining most of the typically excessively dense grassland cover in this region in a more open condition suitable for SKR. The Lake Henshaw SKR population may have once been connected to, or may have derived from, a more northerly population of this species still present in the region of Aguanga and Anza, in Riverside County.

No populations of SKR have been reported for the southern parts of San Diego County, southward of the area of Ramona. Two field surveys for this species were conducted in the southern portion of the current project region, including one along CalTrans rights-of-way (Montgomery 2000), and one along the proposed southern routes of the Sunrise Powerlink project (Montgomery 2010). Nonetheless, the relatively recent discoveries of this species by S. Montgomery in peripheral areas not previously known to harbor the species, for example, at the Guejito Ranch and in Ramona in San Diego County, and in Norco and Anza Valley in Riverside County (Montgomery 2005, 1992, 1991, 1990; Ogden 1998), suggest

that the limits of the species' range may still be incompletely delineated. It follows that searches for SKR in the southern parts of San Diego County are warranted.

General natural history features and habitat requirements of SKR are fairly well known (O'Farrell 1987, 1990). Habitats occupied by SKR characteristically occur on level to gently sloping terrain, although the species has occasionally been found on relatively steep slopes (e.g. Montgomery 1990; M.J. O'Farrell, pers. comm.). Soils in habitats harboring SKR are typically loamy in nature, while soils dominated by clay or sand very rarely contain this species (Price and Endo 1989; S.J. Montgomery, pers. observ.; M.J. O'Farrell 1987; O'Farrell and Uptain 1989).

Stephens' kangaroo rats typically occupy lands described as disturbed annual grassland and characterized by a relatively sparse cover of both shrubs and herbaceous vegetation. Although resident SKR have occasionally been found in relatively dense stands of sage scrub in Riverside County (S.J. Montgomery, pers. observ.), such occurrences are by far the exception to the rule. A maximum of approximately 30 percent shrub cover is typically cited as the upper limit of shrub cover occupied by SKR (USFWS 1997). Occupied habitats commonly exhibit an abundance of bare soil during much of the year. Nonetheless, spring/early summer flushes of forb (e.g. *Erodium sp.*) growth often temporarily reduce the amount of visible exposed ground. This phase of the yearly cycle of vegetation cover is subsequently transformed by the desiccating forces of the summer season, which cause non-grass herbaceous vegetation (i.e. forbs) to dry up and disarticulate, again revealing the bare ground that is so characteristic of occupied SKR habitat. Reflecting this preference for open ground, a high ratio of forbs to grasses increases the suitability of grasslands for this kangaroo rat. The species typically does not occur in woodlands of any sort.

Factors that reduce vegetation cover, and thereby enhance habitat conditions for SKR, which would encourage wider distribution and/or denser populations of this species, include: burning (natural or controlled intentional fires), grazing by cattle and/or sheep, mowing, shallow or in some cases deep discing, certain levels of off-road vehicle activity, certain levels of scraping (by heavy equipment), and possibly certain intensities of vegetation crushing (e.g. by vehicular traffic and/or use by military troops). Although deep discing would be expected to eliminate most or all resident kangaroo rats, this type of intense substrate disturbance does loosen the soil, sometimes rendering it more easily excavated by recolonizing SKR attempting to construct new burrows.

Interestingly, increased vegetation cover, which typically follows periods of winter/spring rains, also can occasionally (but temporarily) enhance habitat conditions for this species and result in denser or more widely distributed SKR populations (M.J. O'Farrell, pers. comm.; S.J. Montgomery, pers. observ.; Price and Endo 1989). The mechanism for this effect is the increase in herbaceous plant seed production that follows periods of winter/spring rainfall. This increase in the availability of seeds, the primary food of SKR, would be expected to increase breeding success in SKR and thereby produce higher numbers of SKR. Higher numbers of SKR in occupied habitats would in turn likely increase dispersal into (and the colonization of) suitable surrounding habitats. Although single years of such rainfall effects are in this way beneficial to this species, repeated years of abundant rainfall typically result in widespread stands of non-native grasses that are characterized by dense mats of dead and sprouting grass. Such habitat conditions are generally unsuitable for SKR and lead to decreases in the distribution and/or density of this species.

Stephens' kangaroo rats are capable of occupying small patches of favorable habitat amidst otherwise unsuitable (e.g. dense grassy) habitats. They also readily use narrow strips of open habitat to move between larger blocks of suitable habitat (S. Montgomery, personal observation; O'Farrell 1990; Price and Kelly 1992). Abundances of SKR can fluctuate widely among seasons and years, due to reproduction, habitat changes (e.g. fire), and unknown factors.

Areas lacking SKR while exhibiting soil, topographic and general vegetation (i.e. grassland) conditions that appear to be suitable for the species are frequently problematic. Possible reasons for the species' absence in such areas include: (a) excessively dense grass cover; (b) long-term substrate disturbance (e.g. cultivation); and/or (c) inaccessibility of suitable habitat areas to SKR dispersing from established populations, due to excessive distances or due to large tracts of unsuitable habitat/topography between occupied and unoccupied areas.

Other as yet undetermined factors also may prevent SKR from either colonizing or maintaining viable populations in apparently suitable habitats. For example, soils appearing suitable at the surface may exhibit a shallow hard pan that prevents requisite deeper burrowing by SKR. Or, pocket gophers (*Thomomys bottae*) may be required to excavate burrow systems (gopher burrows are similar in diameter to those of SKR) in certain harder soil types before SKR are able to colonize such areas; that is, gophers may be precursors to colonization by SKR in some habitats with harder substrates. California ground squirrels (*Spermophilus beecheyi*) may serve a similar function as gophers by preparing harder soils for colonization by SKR, although ground squirrel burrows typically are much larger than those used and preferred by gophers and SKR. If this previously described relationship is true, then the absence of gophers (or ground squirrels) could effectively prevent SKR from utilizing particular habitats that exhibit very hard substrates.

Certain apparently suitable grassland habitat areas also may be largely or frequently unoccupied by SKR due to the presence of a high water table, or even standing surface water, during periods of high rainfall. Thus, such habitats may be generally suitable for and occupied by SKR during certain dry seasons or years, but unsuitable and unoccupied during wet periods.

All of the factors and scenarios described above were considered in analyzing the potential presence of SKR in grassland habitats in the Project Area during the current field study.

1.4 METHODS

Stephen J. Montgomery, the principal investigator for the current field study, is a biologist permitted to conduct SKR surveys by the U.S. Fish and Wildlife Service (Permit TE45541-10) and California Department of Fish and Game (Memorandum of Understanding). Montgomery performed all SKR field investigations for this project, except for helicopter overflights.

The field survey occurred in the following three phases.

1. Stands of grassland and sparse sage scrub habitats were initially noted on aerial maps during helicopter flights over the Project Area. Particular attention was given to larger-scale and interconnected smaller grasslands.

2. Follow-up ground truthing visits were then conducted at mapped grassland and sparse sage scrub areas (Survey Areas), to check for diagnostic kangaroo rat sign (tracks, scat, burrows) and to assess the likelihood of SKR presence in identified suitable grassland habitats. Grassland locations with kangaroo rat sign were noted on aerial maps and slated for subsequent trapping surveys. The Survey Areas can be found in Appendix A.
3. A trapping survey was then carried out at locations identified as potentially harboring SKR.

Since SKR prefer open grassland and sparse sage scrub habitats with at least some bare ground, searches for kangaroo rat sign focused on locations exhibiting these characteristics. In grasslands and sparse sage scrub stands occupied by SKR, evidence of the activity of these kangaroo rats is common along trails and dirt roads and in other areas of bare soil. Thus, the initial search for sign focused on such preferred open locations, following the logic that if sign was not visible in such open preferred habitats, it also would not be present in less preferred habitats. However, when sign was detected in preferred open habitats, searches for sign were then expanded into adjacent sub-optimal habitats.

If kangaroo rat sign was absent in high-likelihood (for SKR) habitat areas, the grassland was considered unoccupied by SKR. If kangaroo rat sign was found to be present, then the grassland was evaluated for its potential for SKR, using the following criteria: (1) What is the overall area of the grassland? Larger blocks of grassland habitat generally have a higher likelihood of harboring SKR than smaller blocks; (2) Is the grassland completely surrounded by steep/rugged terrain covered in dense chaparral/scrub vegetation, suggesting that SKR would not be able to access the site even if suitable habitat were present; (3) Does the overall structure of the grassland appear to be generally suitable for SKR, with abundant areas of bare mineral soil?; (4) Are the extant kangaroo rats using the habitat in a way that is similar to that typically exhibited by SKR; that is, are noteworthy numbers of active burrows visible in open areas both off and along roadways and trails? If this evaluation indicated that the habitat was unsuitable for SKR, the grassland was confirmed as unoccupied by this species. If the evaluation could not eliminate the potential for SKR at a particular grassland, a trapping survey was conducted to confirm the presence/absence of this species. In areas confirmed as occupied by SKR, which only included the Lake Henshaw Area, the relative density of SKR in mapped occupied habitat areas was estimated by the density of active burrows.

Grasslands not excluded from consideration as occupied by SKR were trapped to determine what species of kangaroo rat was responsible for the observed kangaroo rat sign. SKR and the non-endangered Dulzura kangaroo rat (*D. simulans*) (DKR) are the only species of kangaroo rats known to inhabit the western (non-desert) portion of the Project Area, and the diagnostic signs of these species are quite similar. As a result, areas exhibiting kangaroo rat sign and habitat conditions apparently suitable for SKR had to be trapped to confirm the identity of the resident species.

Only areas exhibiting clear or very likely signs of kangaroo rats were trapped. Traps were set and baited with a mixture of millet and sunflower seeds in the late afternoon/early evening, checked for captures near midnight, and then checked again and closed for the day each following morning. All captured animals were identified to species and released unharmed where trapped. Captured animals were not marked; thus, reported trap results are in terms of total captures of each species at each location. The

trapping effort was intended to confirm presence/absence of SKR, and not to determine number of individuals inhabiting a particular occupied habitat area.

Four locations on or near USFS lands were trapped during the current field study, including:

- Moreno Lake area, Project Map MS-062
- La Posta area, Project Map MS-072
- Lake Henshaw, Project Map MS-012
- Julian (Eagle Creek) area, Project Map MS-025

All four locations exhibited abundant kangaroo rat sign (burrows, scat, and tracks) in open grassland habitats that appeared generally suitable for SKR. All four locations were trapped for one night, since the first night of trapping yielded either an abundance of DKR captures and no SKR (Julian, Campo, LaPosta), or several SKR (Lake Henshaw site).

Survey areas containing grasslands with any potential for SKR were mapped and characterized (Appendix A) by the following categories:

- Unsuitable: Unsuitable habitat present.
- Suitable – Unoccupied
- Suitable – Trace Density
- Suitable – Low Density
- Suitable – Moderate Density
- Suitable – High Density
- Suitable - Low-Moderate Density
- Suitable – Low-High Density
- Suitable – Moderate-High Density

The sites trapped in the current field effort were not on CNF lands. The rationale for including lands not directly within CNF ownership was two-fold. First, various access routes leading to project alignment locations will be necessary during the construction and subsequent maintenance of the alignment over time. These access routes may harbor populations of SKR and could, therefore, be negatively affected by construction and maintenance activities. Second, although a particular section of the alignment might not harbor SKR, immediately adjacent lands could harbor the species. And over time, individuals living in habitats adjacent to alignment sections could feasibly disperse into and occupy those alignment sections themselves.

1.5 RESULTS AND DISCUSSION

A vast majority of the U.S. Forest Service lands assessed during the current survey generally occur on lands too steep and/or too rocky (boulders, bedrock), and/or exhibit habitat types (dense scrub/chaparral or woodlands) unsuitable for SKR. Furthermore, most grasslands in the Project Area are surrounded by terrain that either is too steep or too rocky or exhibits habitats unsuitable for SKR. In addition, those lands within the Project Area that do exhibit grassland habitats, although fundamentally suitable for SKR, exhibit grass cover that is too dense for this species.

Only four locations exhibited habitat conditions that appeared suitable for and possibly occupied by SKR (see list above, in Methods). All but the Lake Henshaw trapping area can be viewed as ultimately surrounded by expansive regions of unsuitable rugged/steep terrain and dense scrub/chaparral vegetation. Nonetheless, the overall open conditions and the density of kangaroo rat sign/activity at each of these sites were sufficiently similar to typical SKR occupied habitat to warrant a trapping survey.

Prior to the trapping survey, habitat areas other than Lake Henshaw were considered to be very unlikely to be occupied by SKR, due to their isolation from known occupied habitats within the species' range, and their locations in regions entirely surrounded by large expanses of extremely rugged and rocky terrain covered in dense stands of unsuitable (chaparral, woodlands, sage scrub) habitat. Thus, an extensive trapping regime in such locations was considered unnecessary; rather, the immediate capture of large numbers of DKR at the sites exhibiting kangaroo rat sign was considered sufficient confirmation of the absence of SKR.

Weather conditions during the trapping surveys were generally mild and included clear or mostly clear skies, air temperatures ranging from 50 to 80 degrees Fahrenheit and low wind speeds. Trapping during March 2011 in the Julian area occurred under somewhat cooler conditions, including cloudy skies, nighttime temperatures of approximately 48 to 50 degrees Fahrenheit and low wind speeds (Table 1).

Table 1: Summary of Weather Conditions during 2010 and 2011

Date	Area	Time	Cloud Cover	Air Temp (°F)	Wind Speed (mph)
10/10/2010	Buckman Springs Rd	1200-1930	clear	80-90s	5-8
11/18/2010	Vista Irrigation Dist.	1400	clear	70	3-8
12/11/2010	Lake Moreno Dr.	1330	clear	70	3-10
12/12/2010	Lake Moreno Dr	1100	clear	82	0-2
12/12/2010	La Posta	1700	clear	70	3-5
12/13/2010	Lake Moreno Dr	0630	clear	55	0-2
12/14/2010	Lake Henshaw	1400	clear	70	2-5
12/15/2010	Lake Henshaw	0630	overcast	49	0-2
3/19/2011	Eagle Creek Road	0700	overcast	48-50	0-5

Four SKR were captured at Lake Henshaw. A total of 17 *Dulzura* kangaroo rats were trapped among the La Posta, Campo and Julian sites. In addition, deer mice (*Peromyscus maniculatus*) were captured at the Campo, Julian and Lake Henshaw sites (Table 2). GPS coordinates of SKR trapping locations are found in Appendix C.

Table 2: Trap Results at Four Locations for 2010 and 2011

Area	Date Traps Checked	# Traps Set	Animals Captured*		
			SKR	DKR	PEMA
A Moreno Lake	12/13/2010	37	0	3AF, 4AM	3
B La Posta	12/13/2010	35	0	1AF, 4AM	0
C Lake Henshaw	12/14/2010	45	1AF, 3AM	0	2
D Julian Area	3/19/2011	30	0	3AF, 2AM,	5
TOTAL			4	17	5

*Animals Captured

SKR = Stephens' kangaroo rat (*D. stephensi*)

DKR = Dulzura kangaroo rat (*D. simulans*)

PEMA = Deer mouse (*Peromyscus maniculatus*)

The results of the habitat assessment and follow-up trapping effort at appropriate locations confirmed that SKR are absent in all parts of the Project Area where access was possible, except in the Lake Henshaw grasslands where the species occupies most of the grasslands west and east of SR79.

The Lake Henshaw SKR population is one of the larger known for the species, and by far the largest known population of the species in San Diego County. The survey results extend the occupied area to the west and north in comparison to the data provided by the CNF as "occupied" by SKR (MS-009 – 012). This expansive grassland (Appendix A) is maintained in a state generally suitable for SKR by cattle grazing. Interestingly, the SKR in certain parts of this grassland appear to be maintaining systems of narrow pathways among their burrow entrances in grass cover that would typically be considered too dense for regular occupation by this species. Photographs (Appendix B) show what can be considered "ruts" in the grass that connect the systems of burrows in this grassland. The relatively low height of grass, as well as scattered cattle trails and/or dirt vehicle roads/trails, very likely are factors that facilitate this unusual occupation of this dense grassland. Nonetheless, the maintenance of such well worn inter-burrow pathways has not been observed by this author in such dense grasslands anywhere else within the known range of this species.

Two large parcels of land were not accessible during the current survey, including (a) the extensive parcels of land westward of Santa Ysabel that are owned in large part by the Tulloch family (Map Pages MS 016-025 – Appendix A), and (b) the large parcel immediately south of Old Highway 80 and southward of southern end of Kitchen Creek Road (Map Page MS-069 – Appendix A). All habitat assessments and associated trapping surveys in this general region have yielded the non-endangered DKR and no SKR. These results indicate that it is likely that SKR are absent in this part of the County. However, since some larger grasslands in the region have not been closely checked for this species, there remains some potential that SKR are present in this region.

The grassland habitats in the Project Area to the west of Santa Ysabel were assessed (and appropriate grassland locations trapped) during field surveys for the Sunrise Powerlink Proposed Northern Alignment. Only the non-endangered DKR was captured during trapping surveys in grassland habitats in this section of the current Project Area (see Montgomery 2007). Thus, it is unlikely that SKR occupy this portion of the Project Area, even though field surveys were not conducted in that area during the current field effort.

The rugged nature of the terrain between known populations of SKR in the northern parts of the county, including the Lake Henshaw area, the Ramona grasslands, and the area of Fallbrook and the San Luis Rey River, may have prevented the colonization of the larger grasslands in the southern part of the county. Future field checks for SKR presumably will confirm the presence/absence of this species in this region.

SECTION 2.0 – REFERENCES

- Lackey, J.A.
1967. Biosystematics of Heermanni group kangaroo rats in Southern California. *Trans. San Diego Soc. Nat. Hist.* 14:314-344.
- Montgomery, S.J.
2010. Stephens Kangaroo Rat Survey Report. Sunrise Powerlink Proposed Southern Route. Prepared for Chambers Group. Irvine, California.
- Montgomery, S.J.
2007. Stephens Kangaroo Rat Survey Report. Sunrise Powerlink Proposed Northern Route. Prepared for Arcadis, Inc. San Diego, California
- Montgomery, S.J.
2006. Results of Field Surveys for the federally endangered Stephens' Kangaroo Rat (*Dipodomys stephensi*) and incidental mammal observations at the RTS Warner Springs property, San Diego County, California. Prepared for Tierra Data Systems. Escondido, California.
- Montgomery, S.J.
2005. Results of 2004 Field Surveys for Stephens' Kangaroo Rats (*Dipodomys stephensi*) at Rancho Guejito, San Diego County, California. Prepared for Helix Environmental Planning. La Mesa, California
- Montgomery, S.J.
2000. Final. Results of Field Surveys for Stephens' Kangaroo Rats (*Dipodomys stephensi*) along Caltrans Rights-of-Way in San Diego County, California. Prepared for San Diego State University Foundation, and CalTrans, San Diego, California.
- Montgomery, S.J.
1992. Search for Stephens' kangaroo rats in the Anza Valley, Riverside County, Calif. (maps, without report). Prepared for Gary Pomeroy, Select Housing Associates. Newport Beach, Calif.
- Montgomery, S.J.
1991. Unpublished results of a preliminary trapping survey for Stephens' kangaroo rats on the Guejito Ranch property east of Escondido, San Diego County, California. Prepared for Pacific Southwest Biological Services. National City, Calif.
- Montgomery, S.J.
1990. Trapping and habitat mapping survey for Stephens' kangaroo rats on the 235-acre Norco Hills Specific Plan, Tentative Tract 25779. Prepared for Windward Development Co. Newport Beach, Calif.
- Montgomery, S.J., J. Sawasaki, and D. Mitchell. 1996/97.
Survey report and addendum for Stephens' kangaroo rat on Marine Corps Base, Camp Pendleton, California. Prepared by Tetra Tech, Inc. San Bernardino, Calif.

O'Farrell, M.J.

1990. Stephens' kangaroo rat: natural history, distribution, and current status. Pp 78-84, In P.J. Bryant and J. Remington (eds.), *Memoirs of the Natural History Foundation of Orange County*; Vol. 3. Pub. by Nat. Hist. Found. of Orange County.

O'Farrell, M.J. and C.E. Uptain.

1989. Assessment of population and habitat status of the Stephens' kangaroo rat (*Dipodomys stephensi*). Calif. Dept. Fish and Game, Non-game Bird and Mammal Section Report (July 1989).

O'Farrell, M.J. and C.E. Uptain.

1987. Distribution and aspects of the natural history of Stephens' kangaroo rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego County, California. *The Wasmann Journ.* 45:34-48.

O'Farrell, M.J., S.M. Juarez, and C.E. Uptain.

1986. A new addition to the known range of Stephens' kangaroo rat (*Dipodomys stephensi*) in San Diego County. *Calif. Fish and Game* 72:187-189.

Ogden (Ogden Environmental and Energy Services).

1998. Stephens' kangaroo rat study for the Ramona Airport Expansion Project, Ramona, California. Prepared for KEA Environmental and County of San Diego Dept. Public Works. San Diego, Calif.

PSBS (Pacific Southwest Biological Services).

1977. Results of a field survey of the biological resources on the Whelan Ranch property. Prepared for RECON, San Diego, California.

Price, M.V. and P.R. Endo.

1989. Estimating the distribution and abundance of a cryptic species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and implications for management. *Conserv. Biol.* 3:293-301.

Price, M.V., P.R. Endo and P.A. Kelly.

1992. Monthly and lifetime movement distances of Stephens' kangaroo rat (*Dipodomys stephensi* Merriam). Final Report, Submitted to Riverside County Habitat Conservation Agency (15 January 1992).

RCHCA (Riverside County Habitat Conservation Agency).

1995. Habitat conservation plan for the Stephens' kangaroo rat in western Riverside County, California. (February 1995)

SJM Biological Consultants.

2005. Results of a 2001-2002 Station-wide survey for Stephens' kangaroo rats (*Dipodomys stephensi*) at Naval Weapons Station Seal Beach, Detachment Fallbrook. Fallbrook, Calif. Prepared for Robbie Knight, Conserv. Mgr., Naval Weapons Station Seal Beach, Detachment Fallbrook, California.

Thomas, J.R.

1975. Distribution, population densities and home range requirements of the Stephens' kangaroo rat (*Dipodomys stephensi*). Unpubl. M.A. Thesis, Calif. State Polytechnic Univ. Pomona, Calif. 64pp.

Thomas, J.R.

1973. Stephens' kangaroo rat survey 1972-73. Calif. Dept. Fish and Game, Special Wildlife Investigations, Job II-54.6. (Final Report)

USFWS (U.S. Fish and Wildlife Service).

1993. Stephens' kangaroo rat study, Naval Weapons Station, Fallbrook Annex, San Diego County, California. Prepared for U.S. Navy, Southwestern Division, Naval Facilities Engineering Command, San Diego, California. (March 1993).

USFWS (U.S. Fish and Wildlife Service).

1997. DRAFT Recovery plan for the Stephens' kangaroo rat (*Dipodomys stephensi*). Prepared by Region 1, USFWS. Portland, OR.

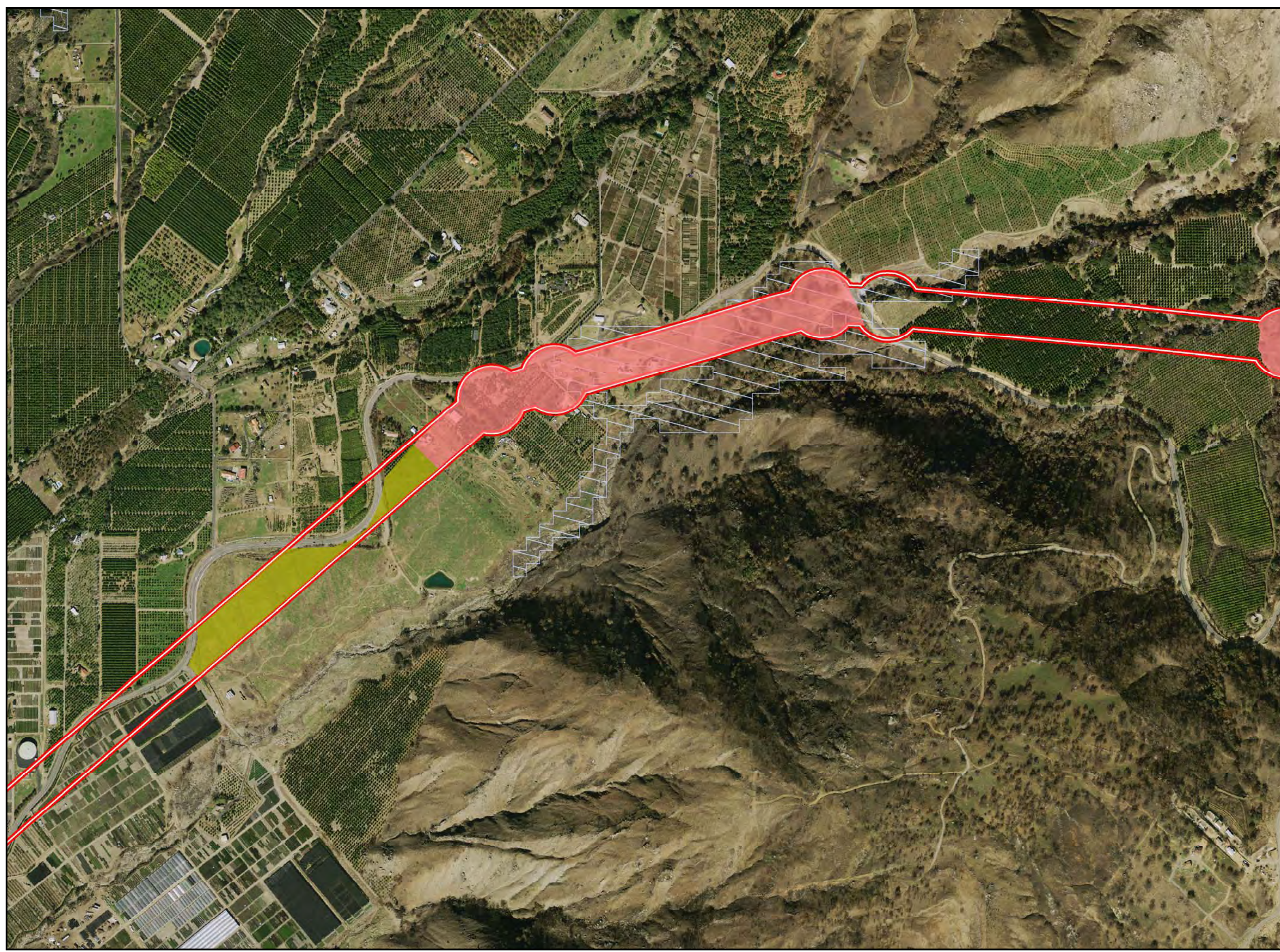


APPENDIX A – STEPHEN’S KANGAROO RAT SURVEY AREAS



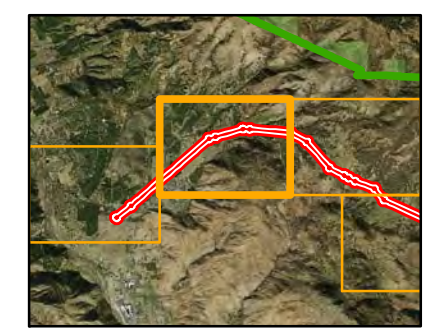
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-002



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

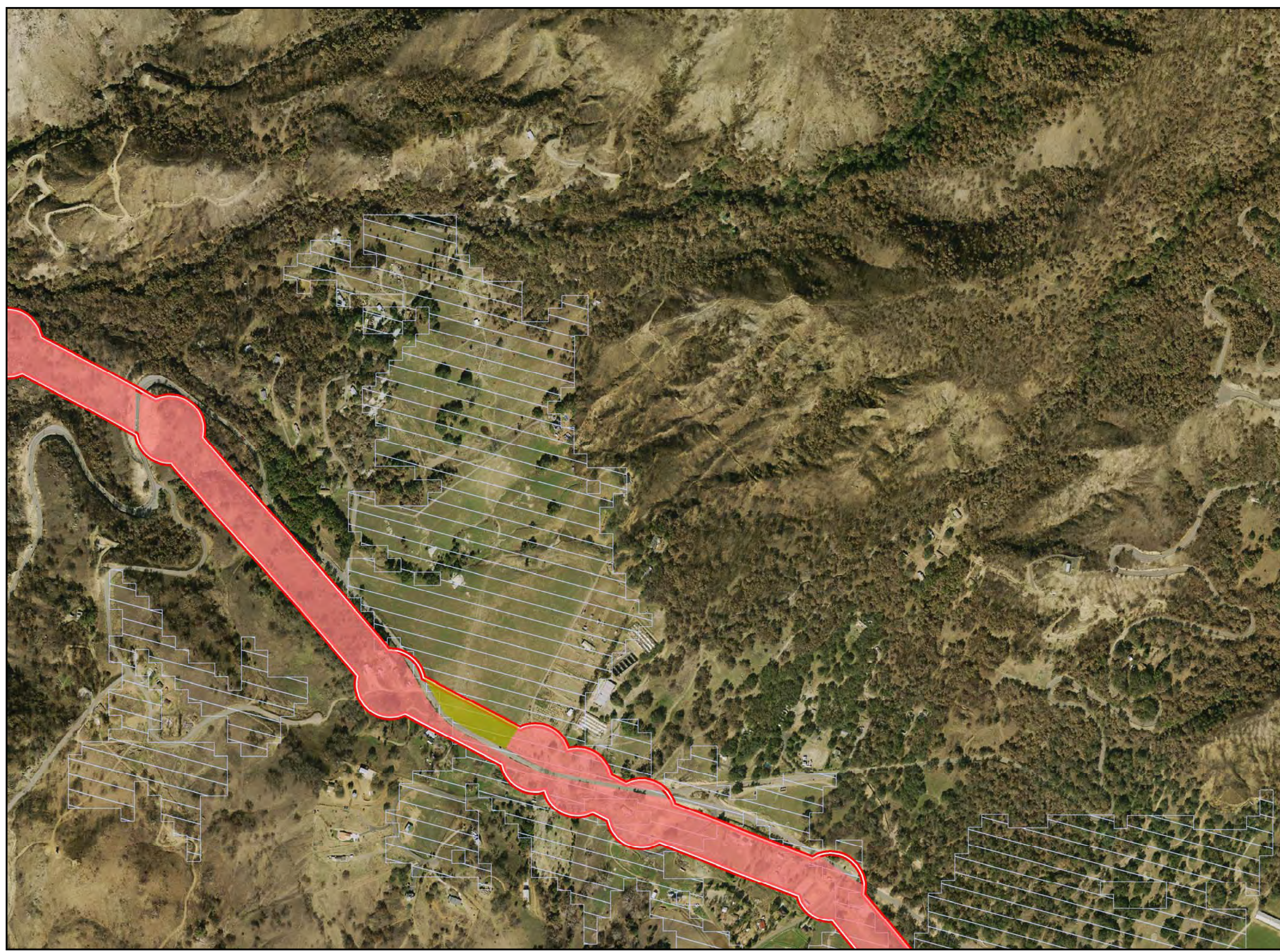


Version Date: 2-2-12



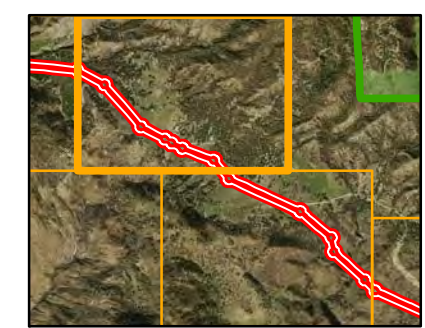
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-003



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

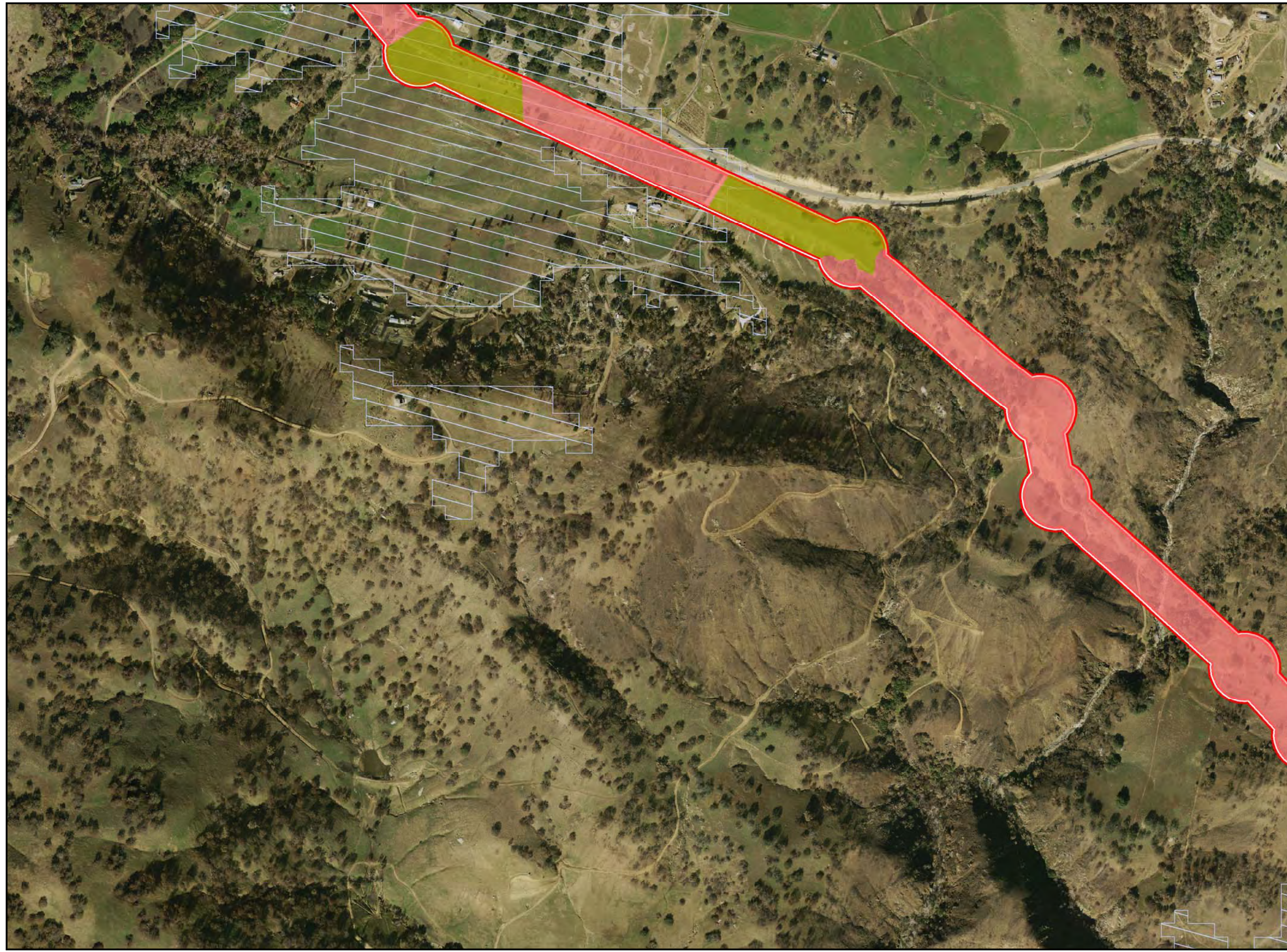


Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

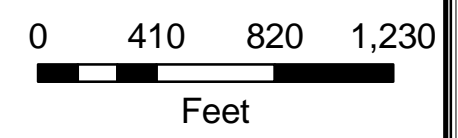
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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

- Occupied Habitat
- Suitable (modeled) Habitat
- Unsuitable
- Suitable - Unoccupied
- Suitable - Trace
- Suitable - Low Density
- Suitable - Moderate Density
- Suitable - High Density
- Suitable - Low-Mod Density
- Suitable - Low-High Density
- Suitable - Mod-High Density



Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

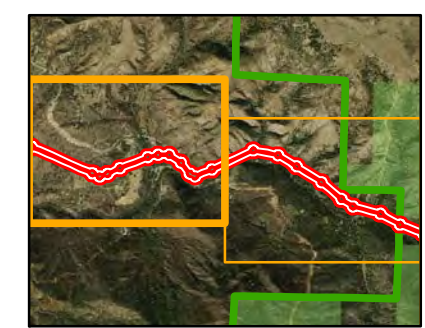
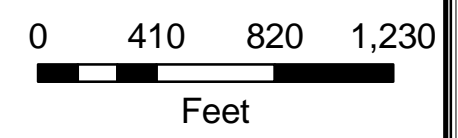
PAGE: MS-005



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

- Occupied Habitat
- Suitable (modeled) Habitat
- Unsuitable
- Suitable - Unoccupied
- Suitable - Trace
- Suitable - Low Density
- Suitable - Moderate Density
- Suitable - High Density
- Suitable - Low-Mod Density
- Suitable - Low-High Density
- Suitable - Mod-High Density

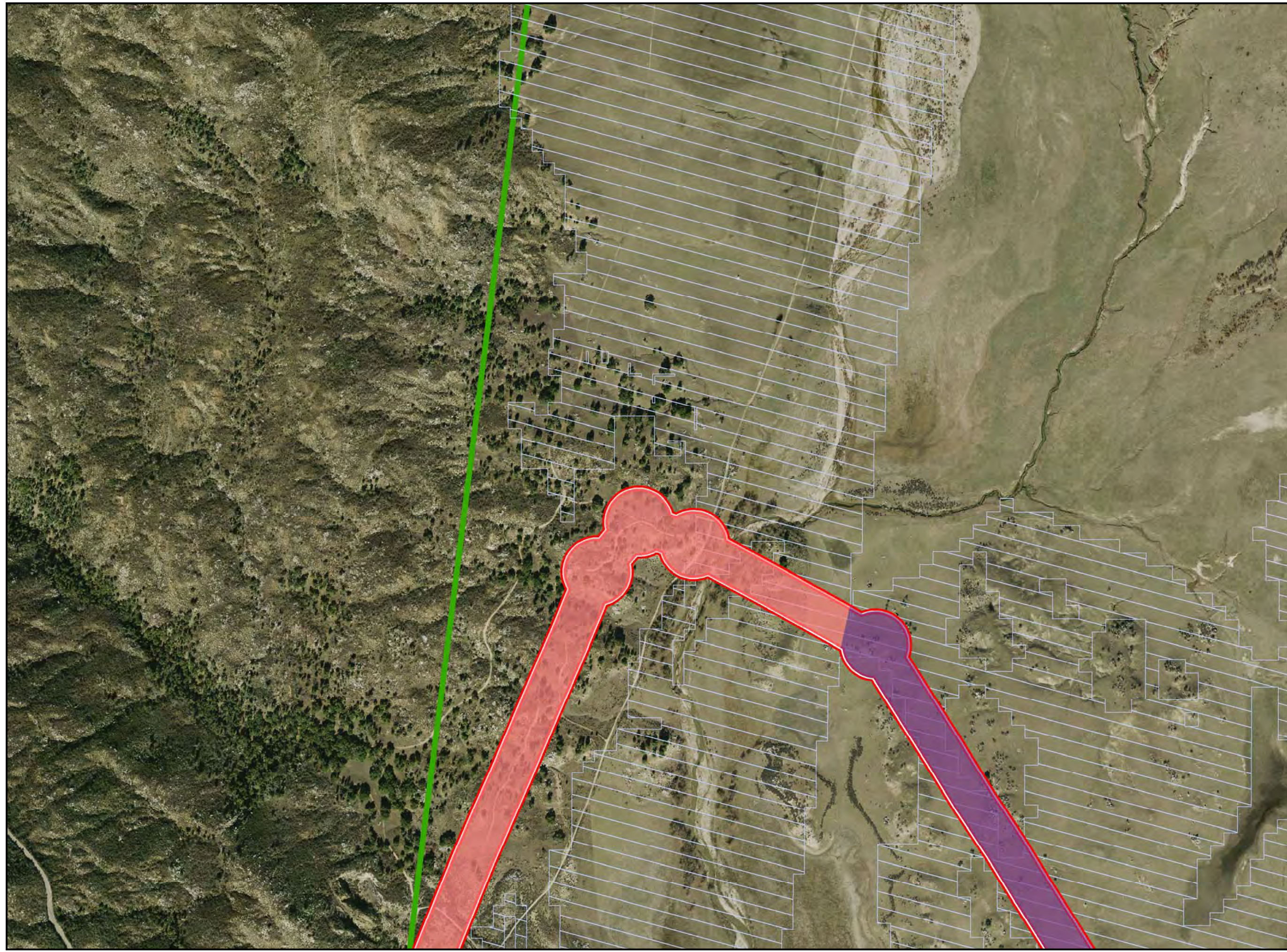


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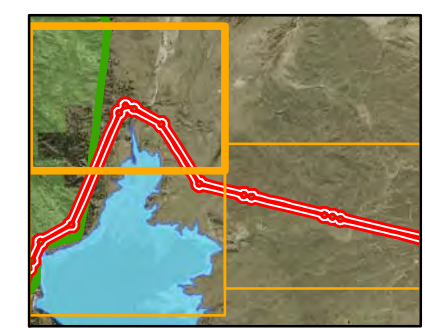
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-009



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

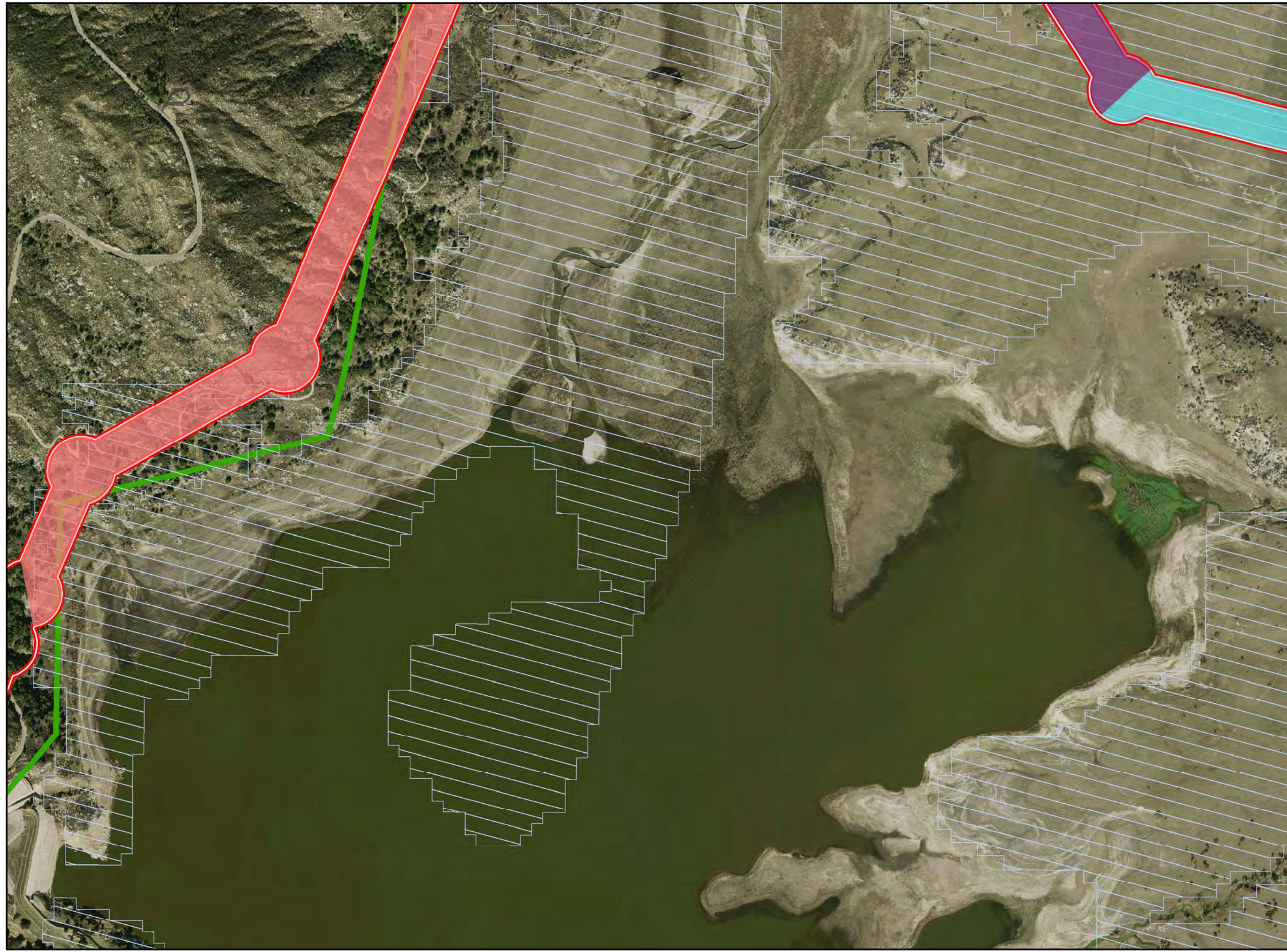


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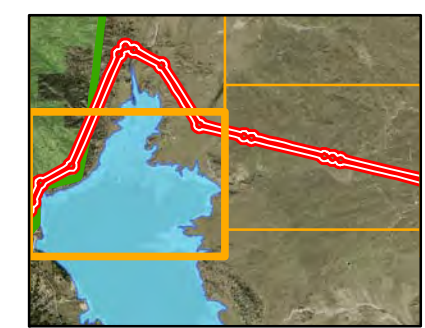
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-010



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

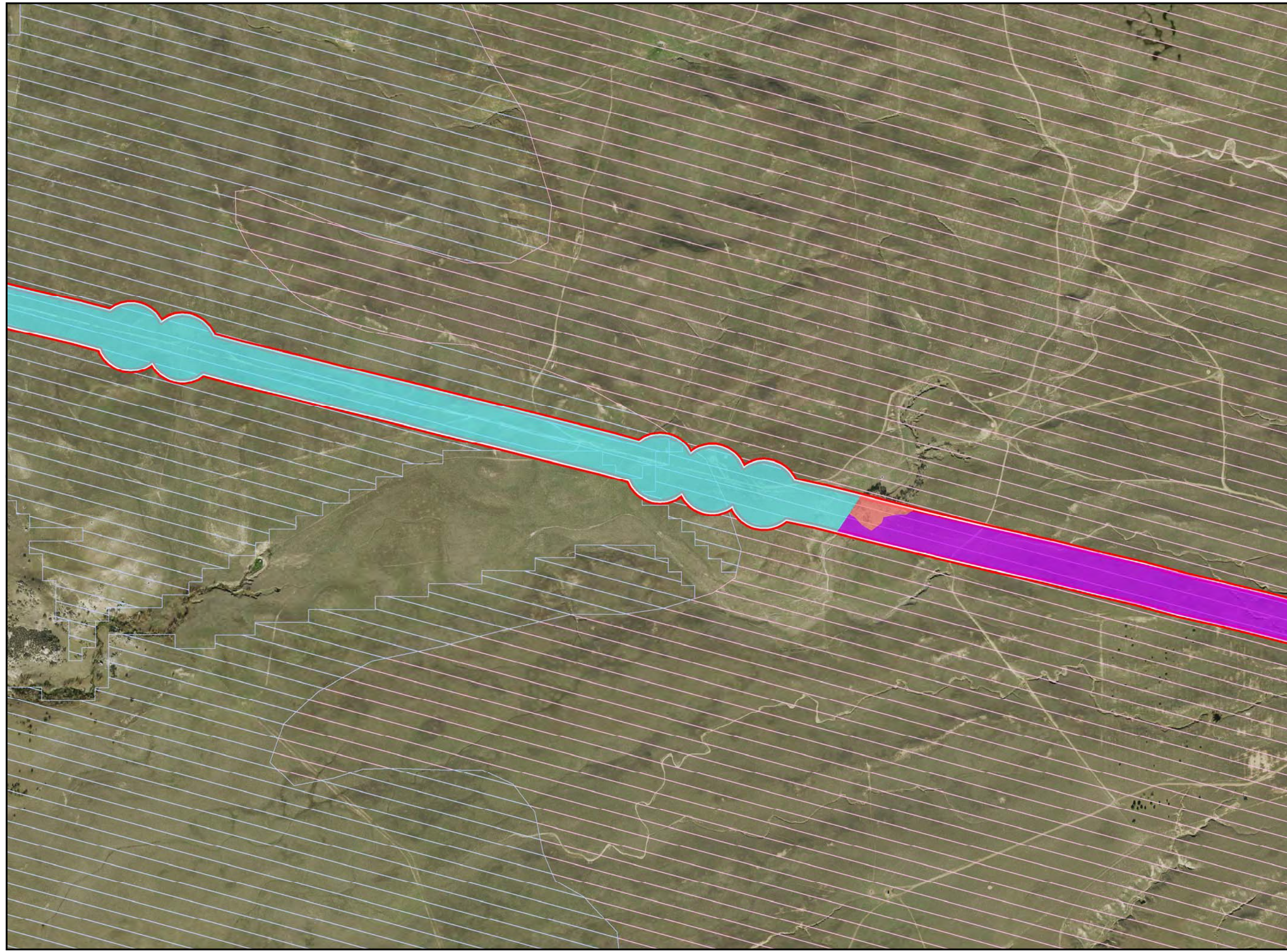


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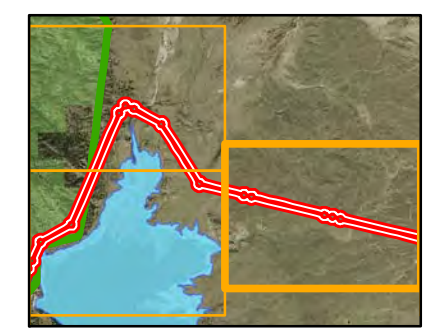
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-011



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density



Version Date: 2-2-12



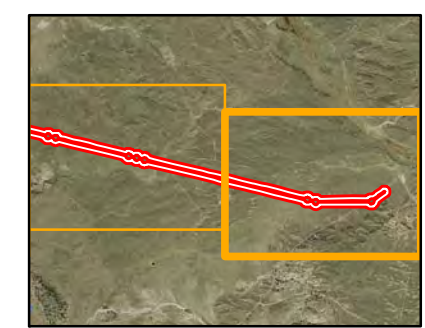
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-012



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

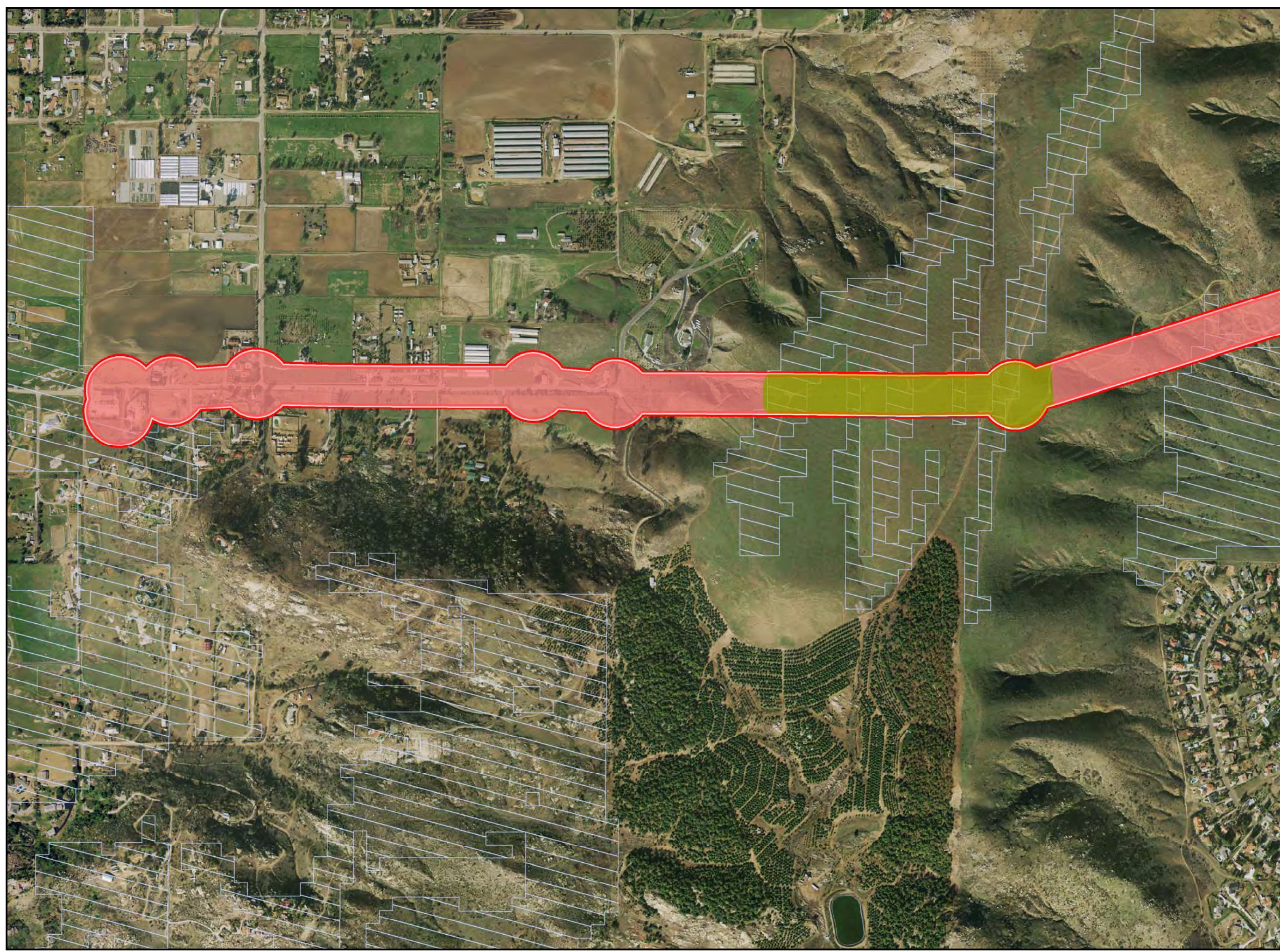


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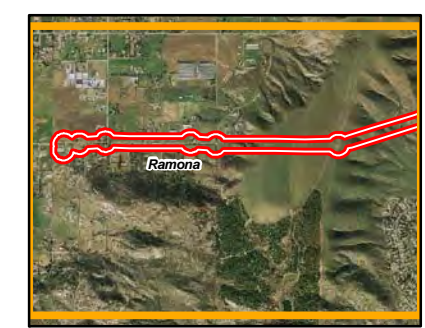
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-013



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

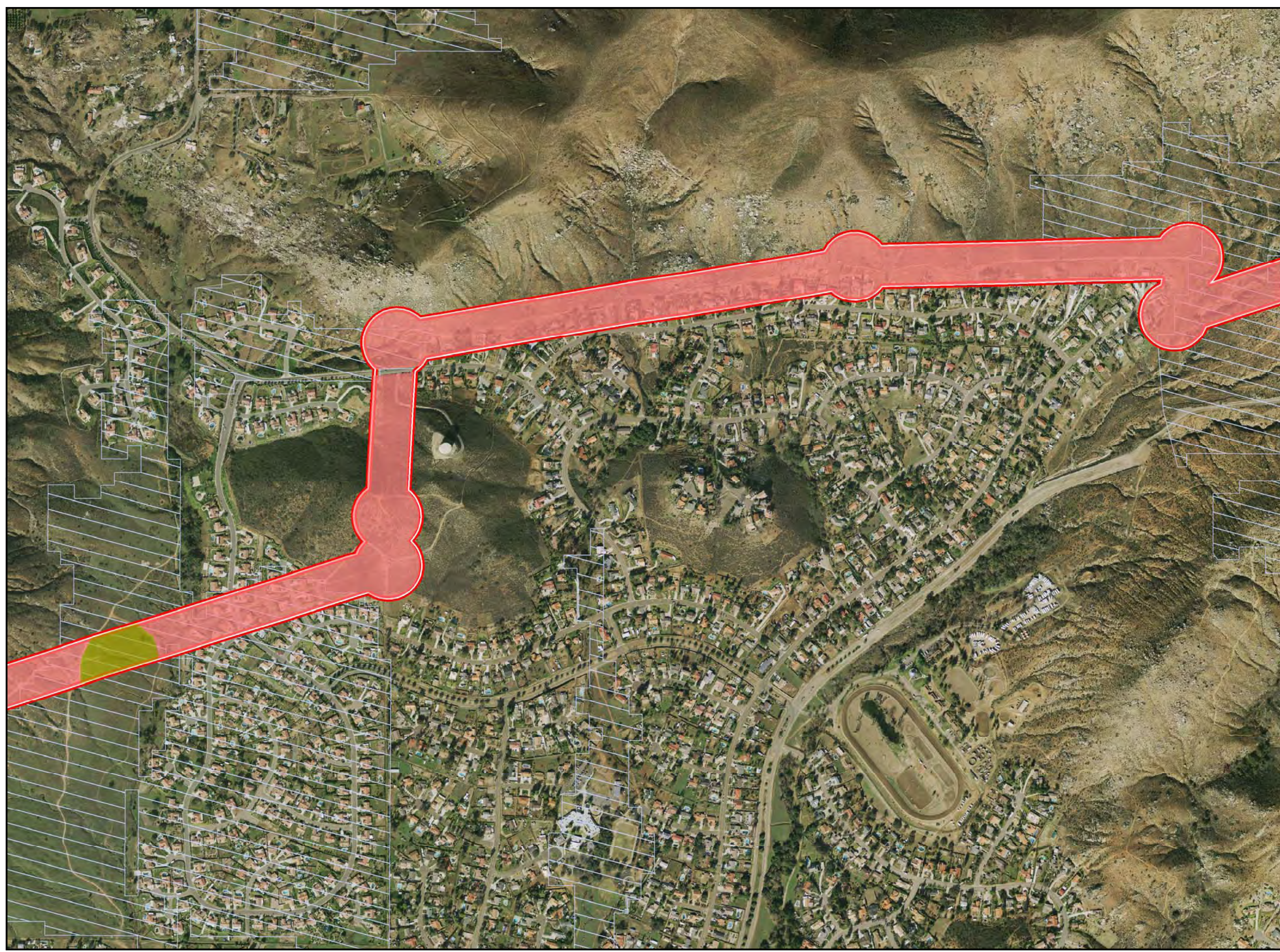





Version Date: 2-2-12














Stephen's Kangaroo Rat Survey Sites

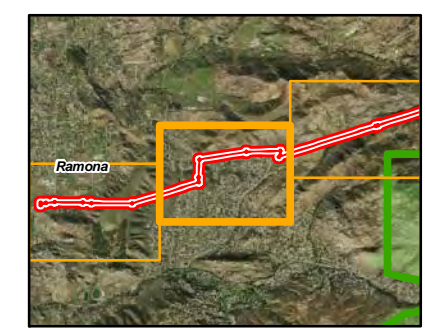
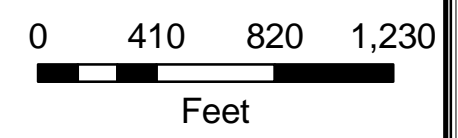
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-  Trap Line
-  Survey Area
-  Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

-  Occupied Habitat
-  Suitable (modeled) Habitat
-  Unsuitable
-  Suitable - Unoccupied
-  Suitable - Trace
-  Suitable - Low Density
-  Suitable - Moderate Density
-  Suitable - High Density
-  Suitable - Low-Mod Density
-  Suitable - Low-High Density
-  Suitable - Mod-High Density

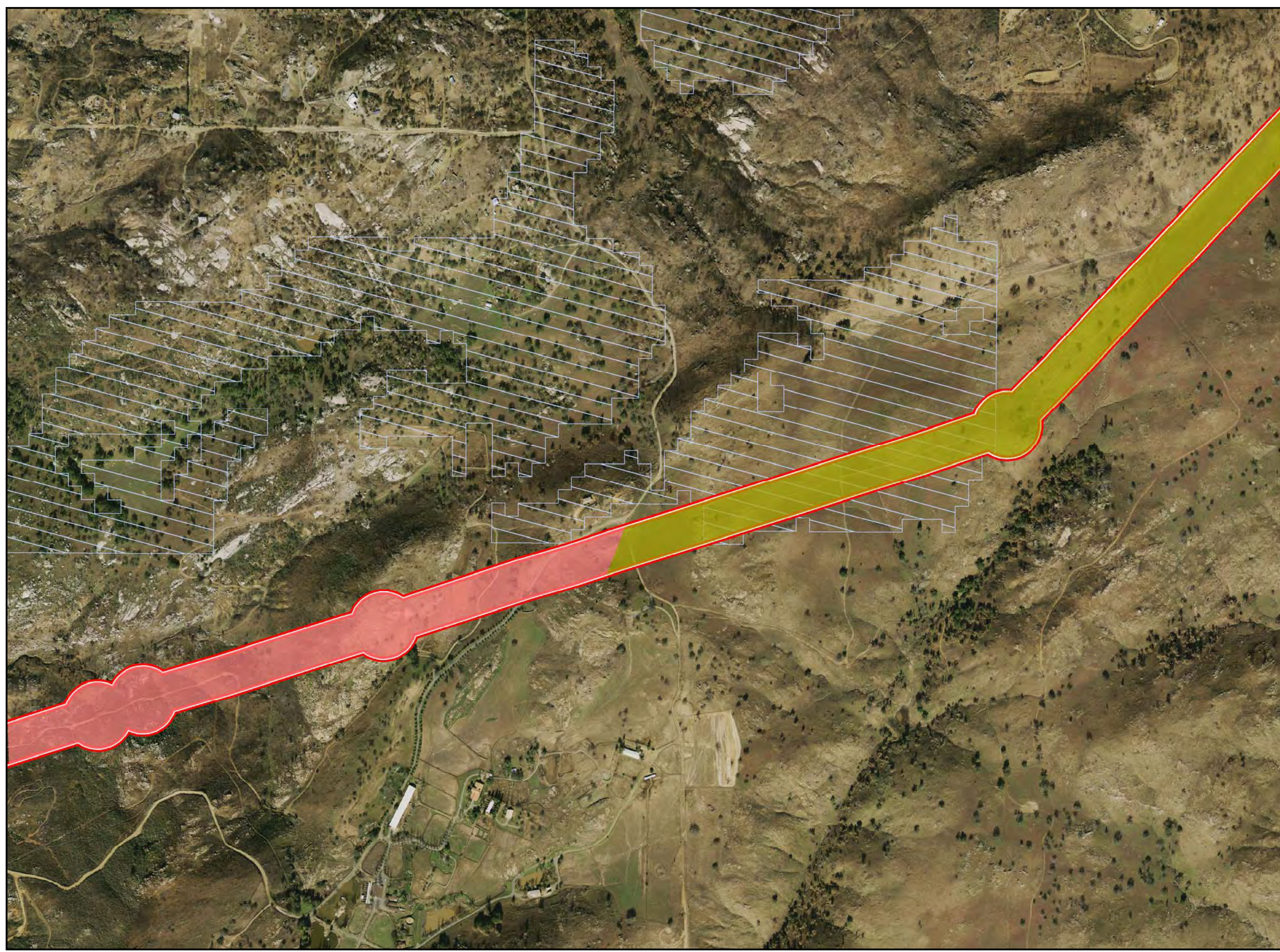


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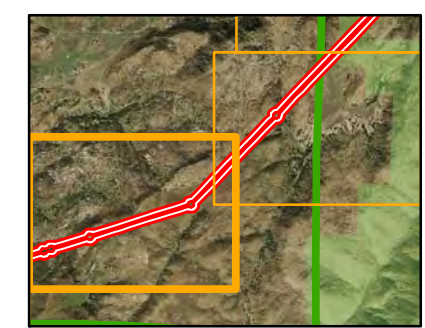
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-016



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

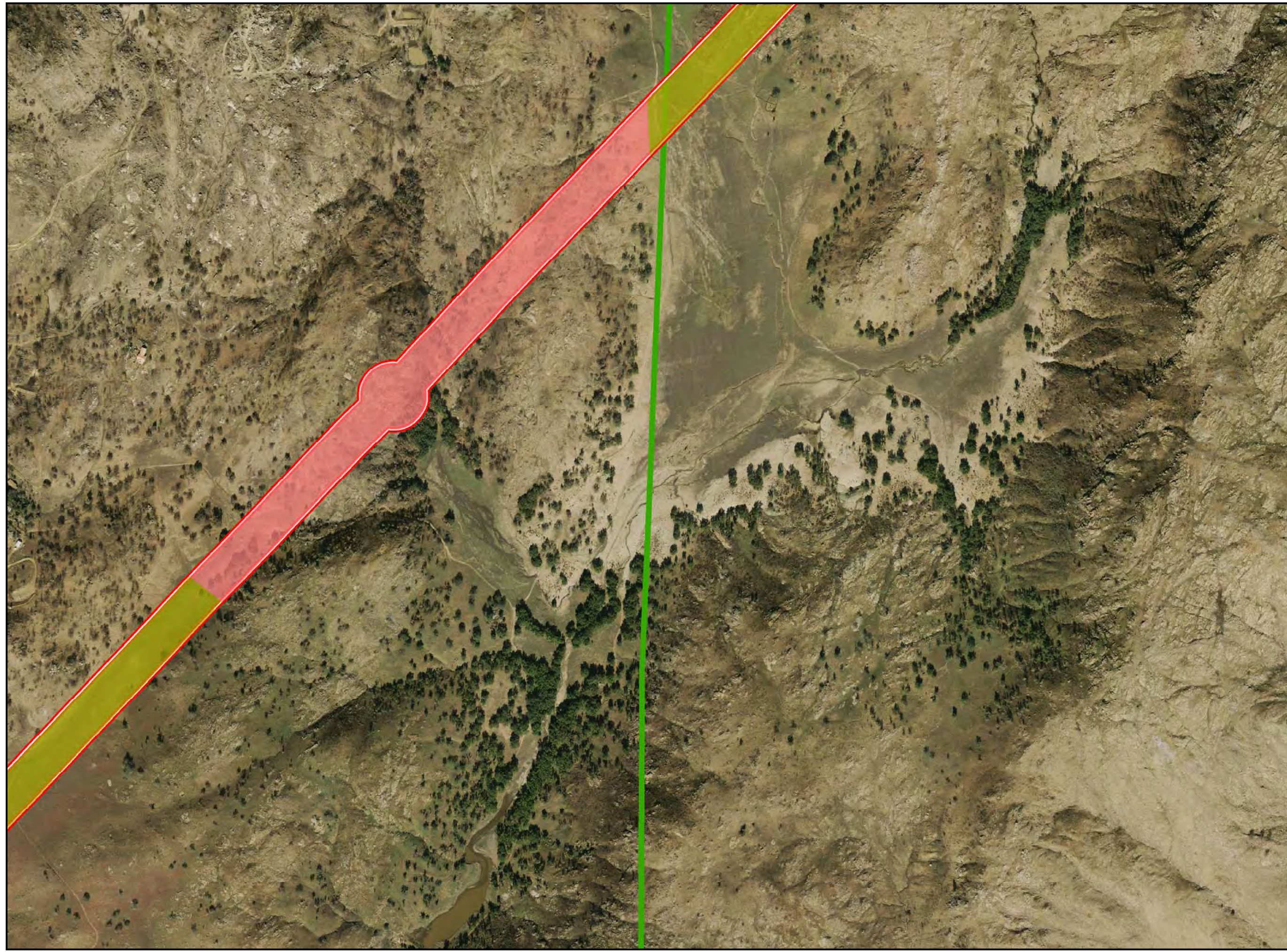


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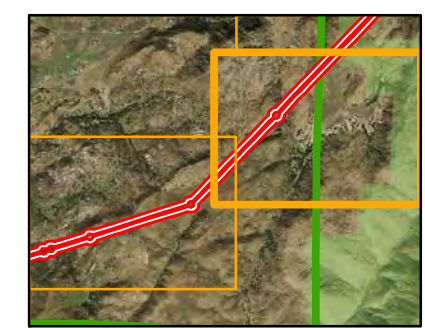
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

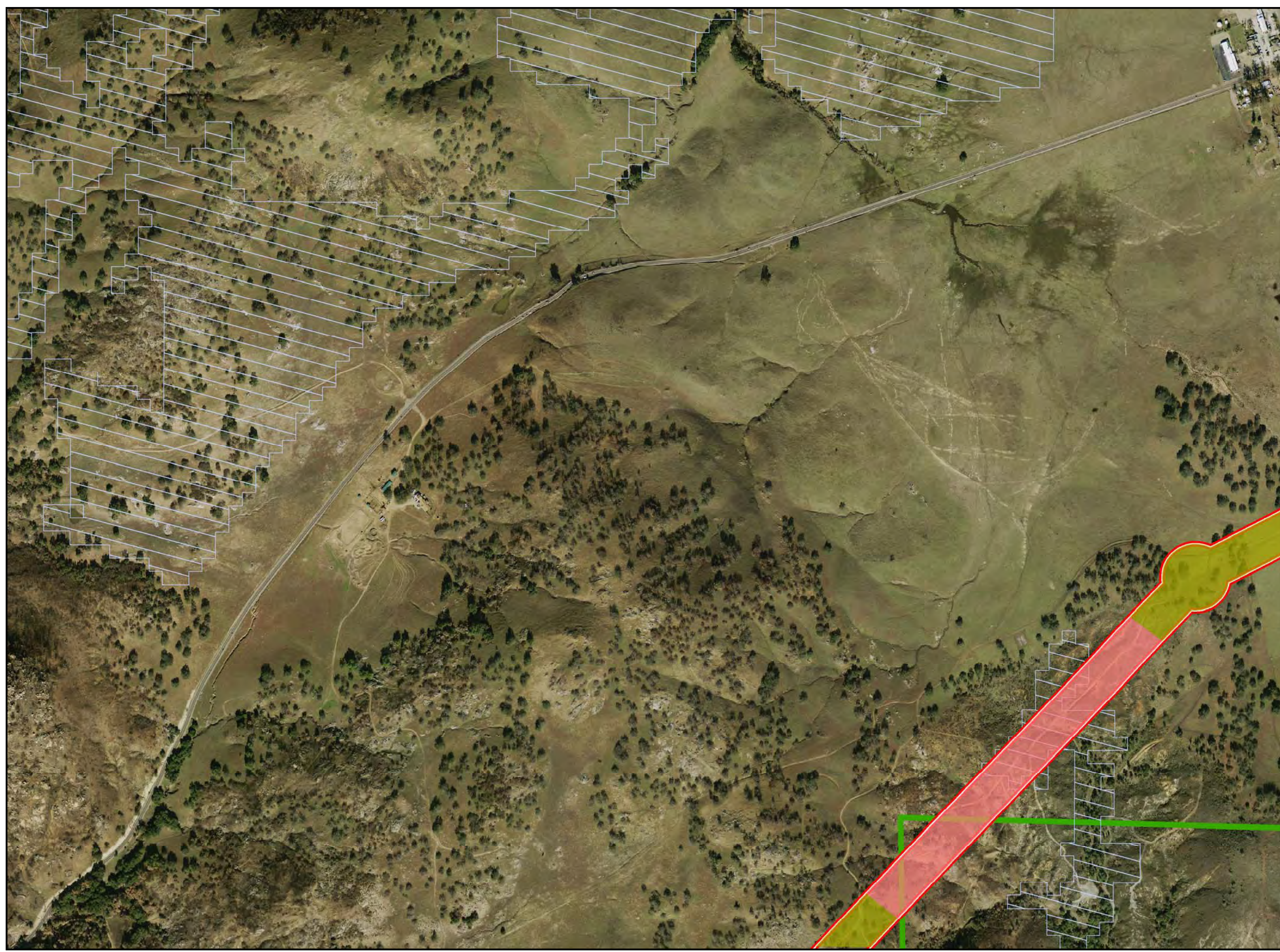





Version Date: 2-2-12














Stephen's Kangaroo Rat Survey Sites

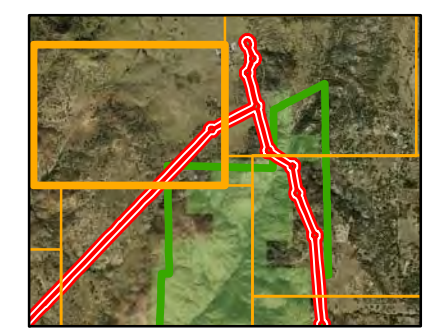
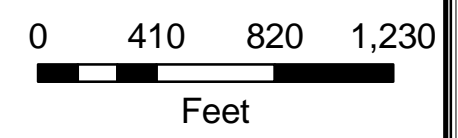
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-  Trap Line
-  Survey Area
-  Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

-  Occupied Habitat
-  Suitable (modeled) Habitat
-  Unsuitable
-  Suitable - Unoccupied
-  Suitable - Trace
-  Suitable - Low Density
-  Suitable - Moderate Density
-  Suitable - High Density
-  Suitable - Low-Mod Density
-  Suitable - Low-High Density
-  Suitable - Mod-High Density

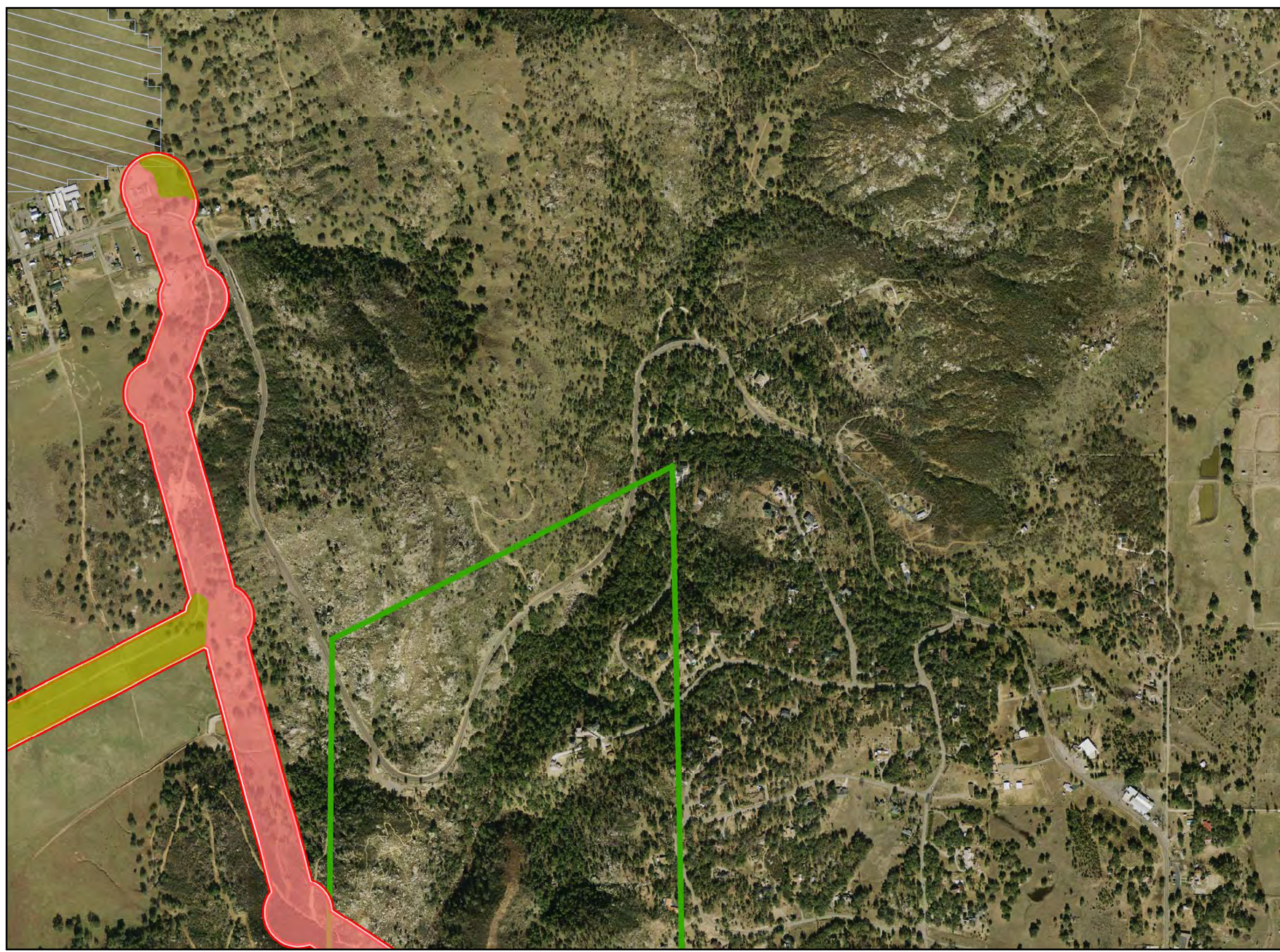


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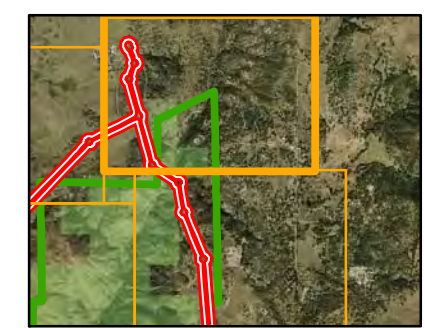
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-021



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

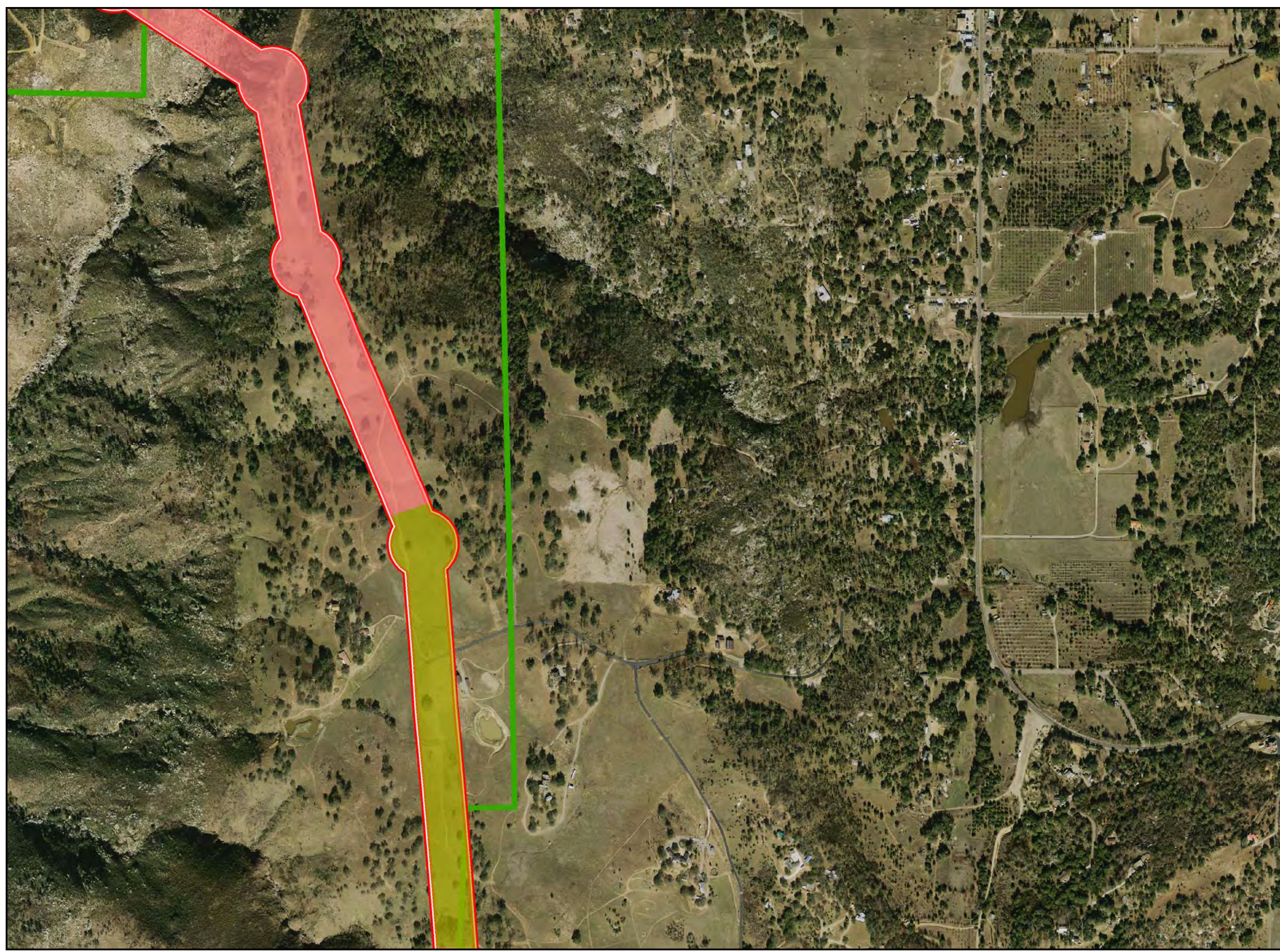


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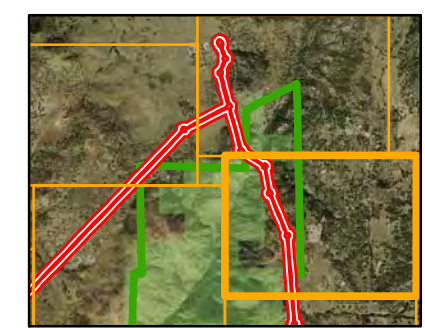
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

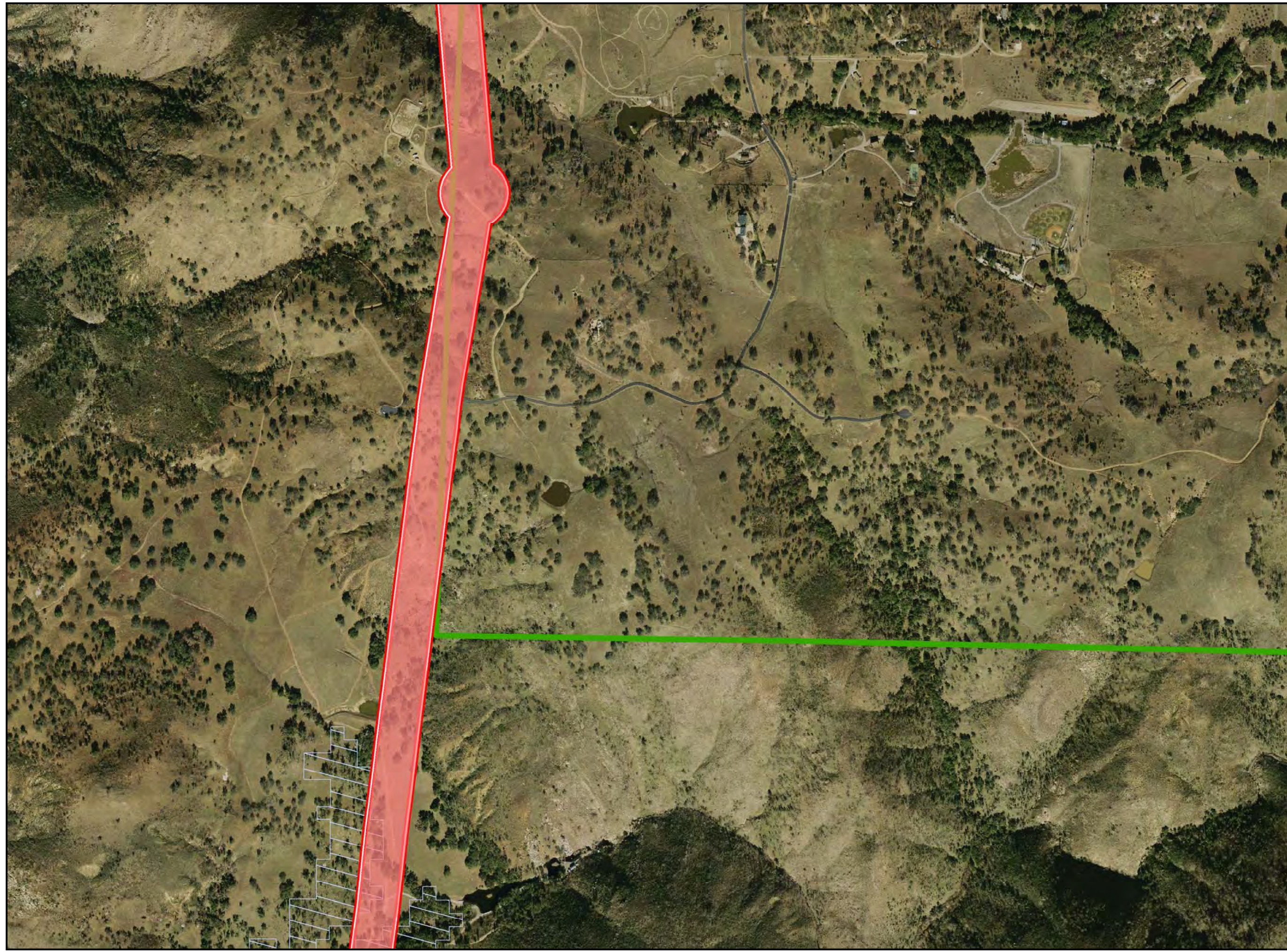


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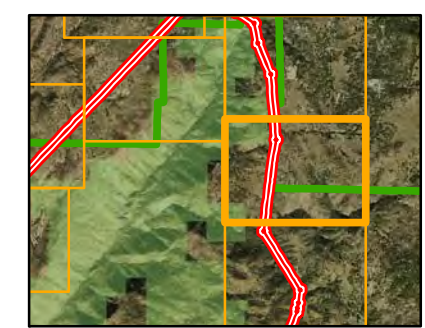
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

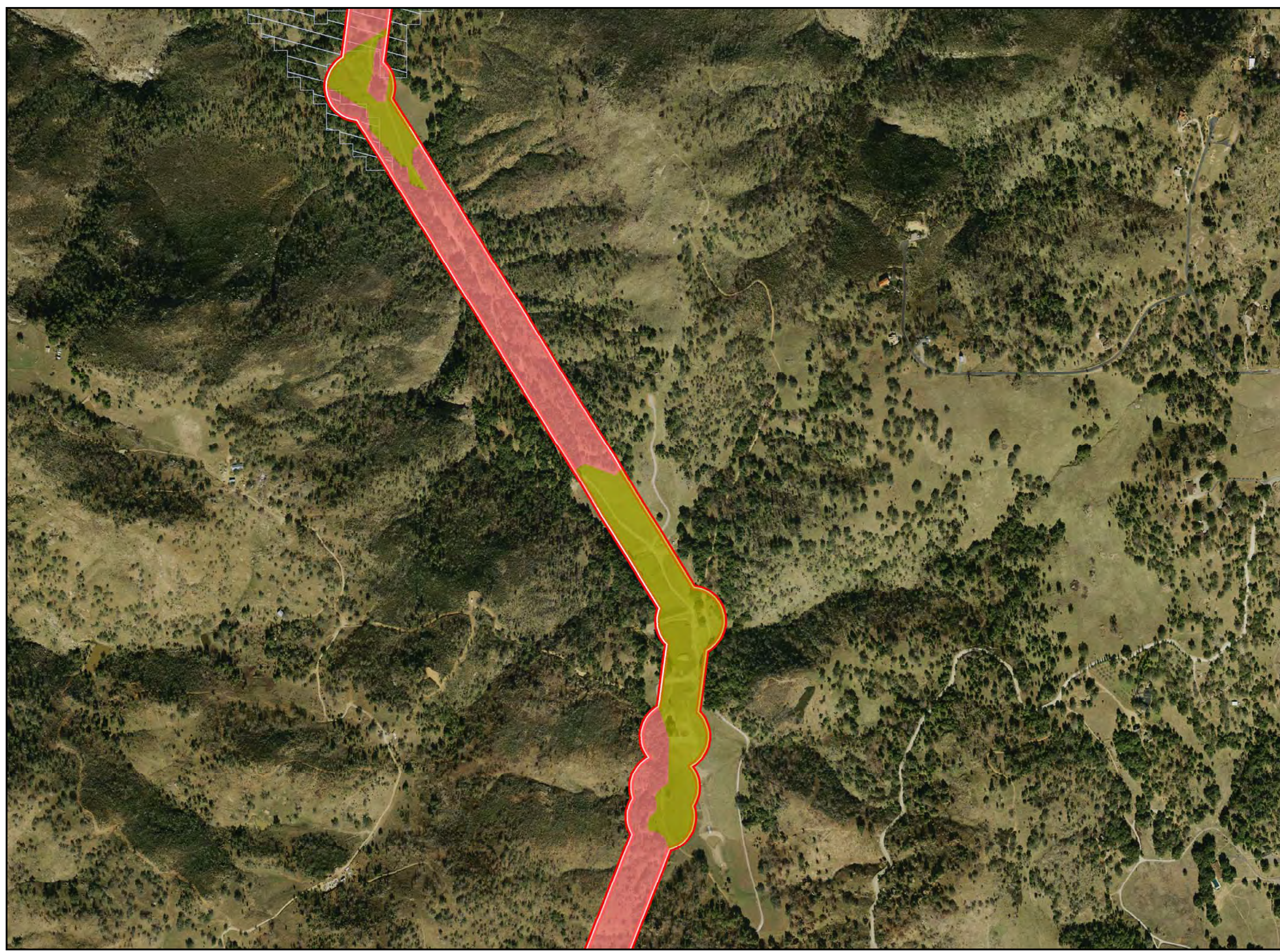


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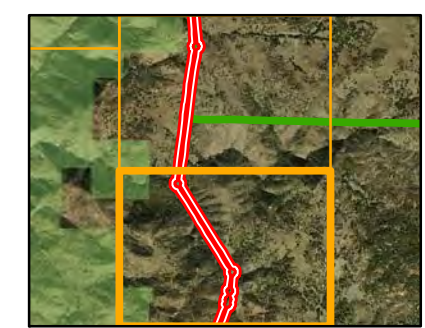
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

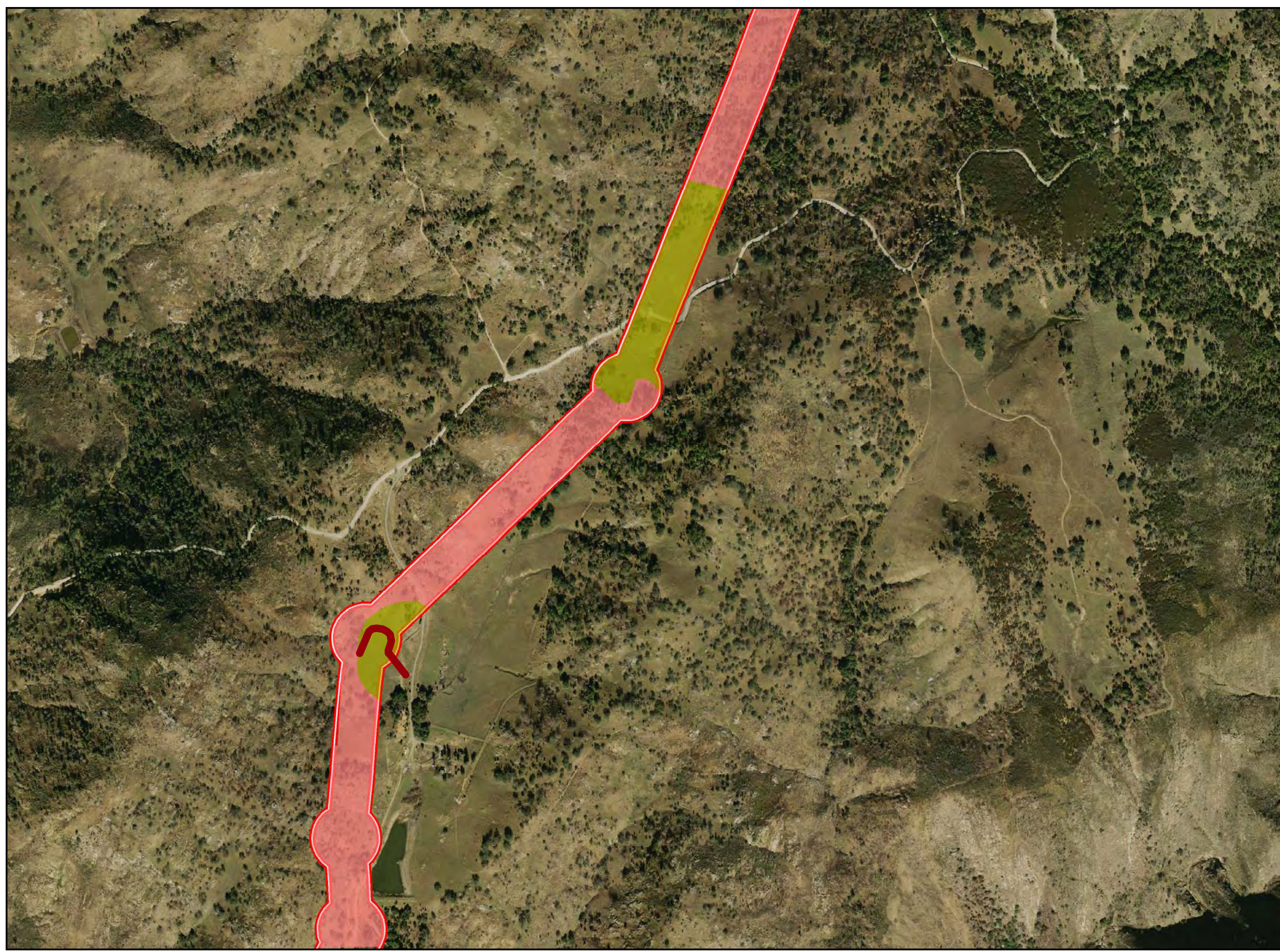


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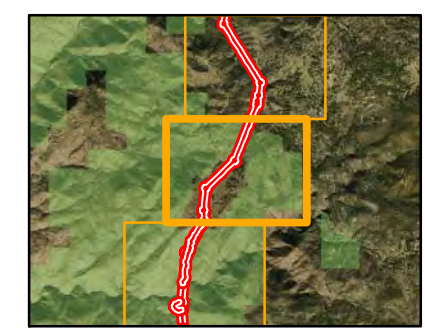
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

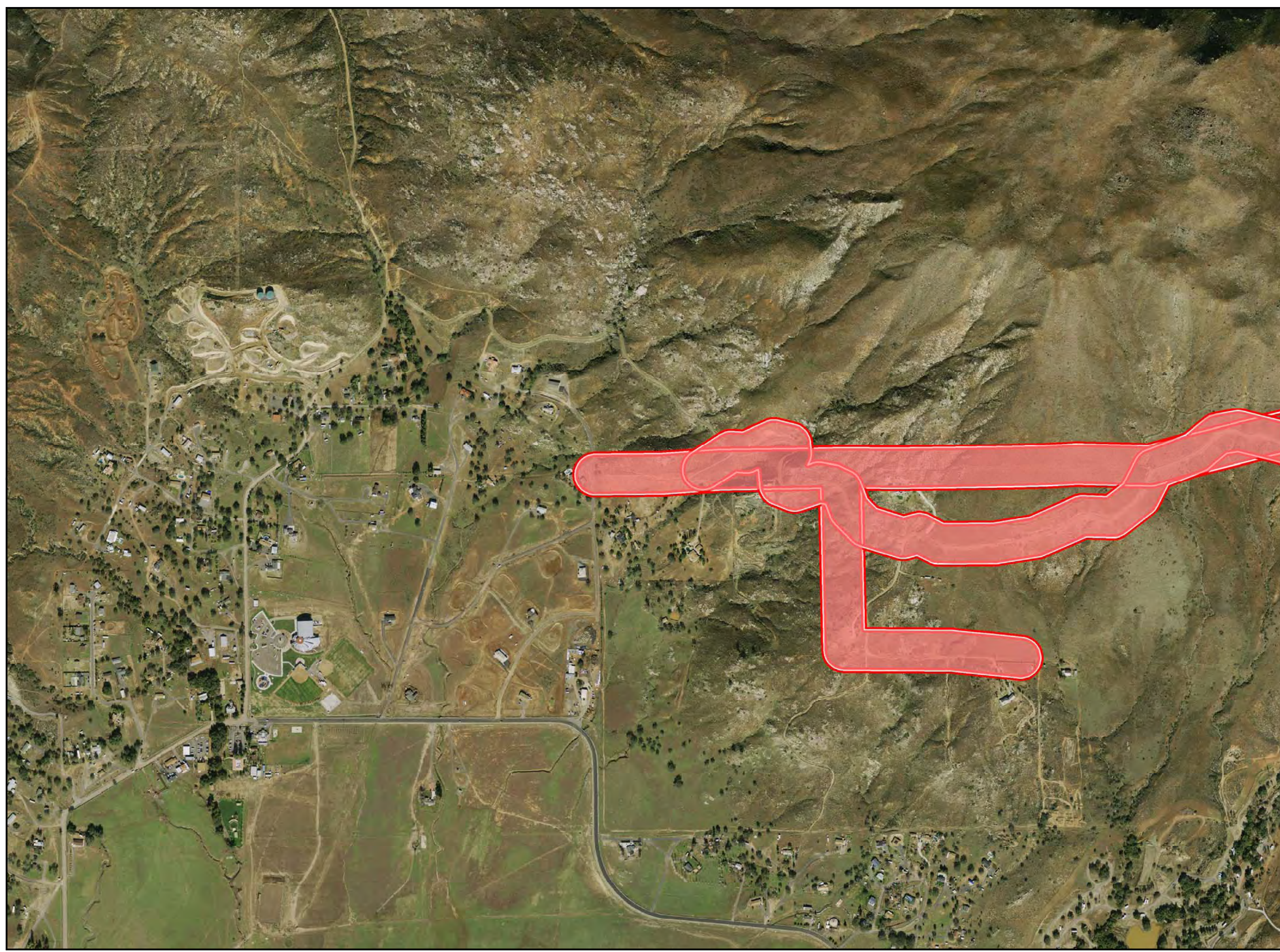


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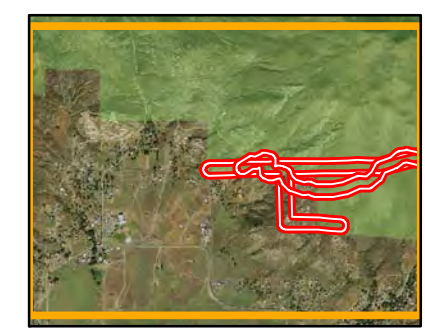
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density



Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

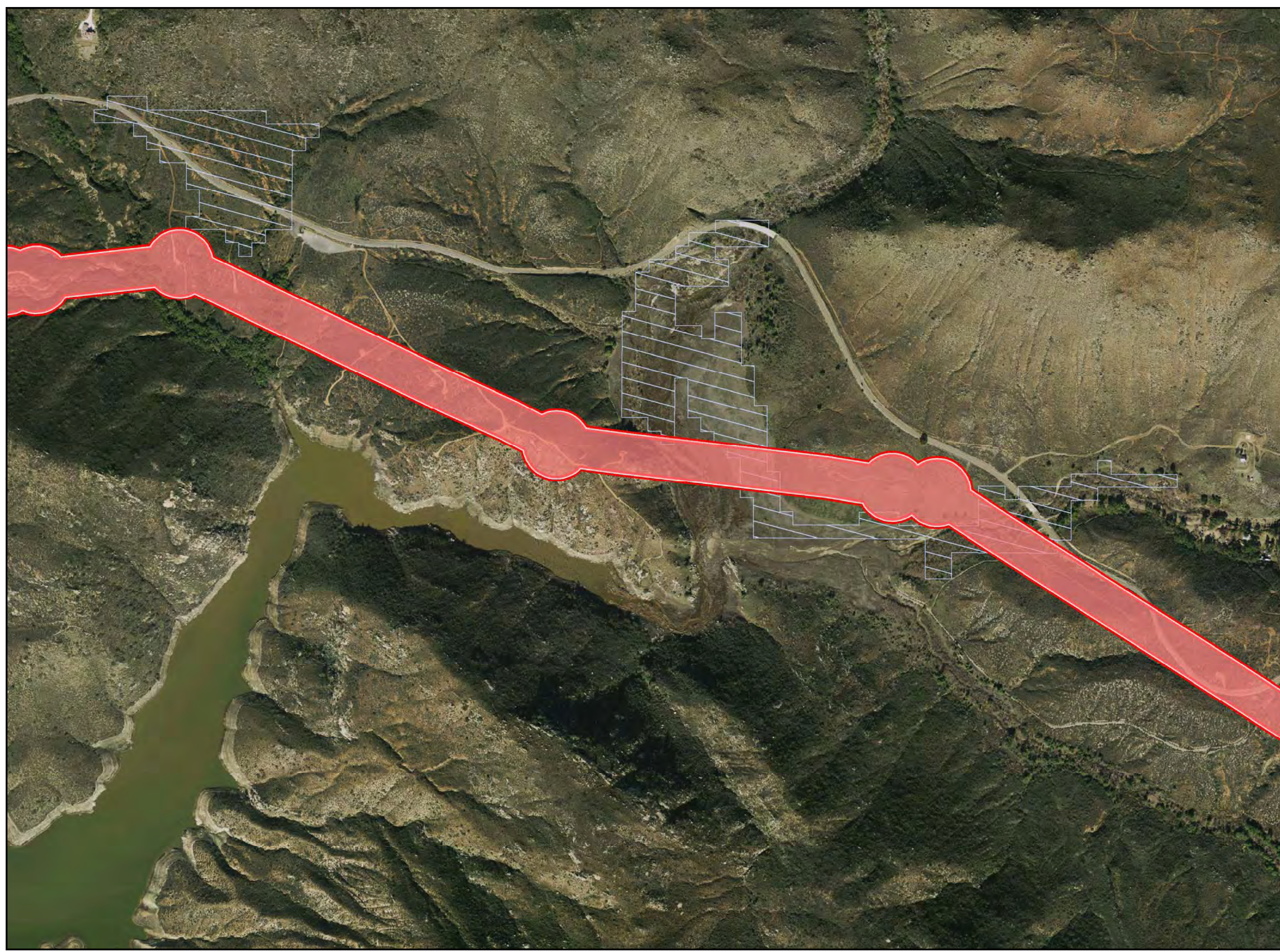


Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

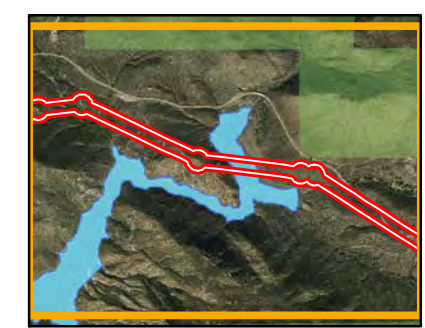
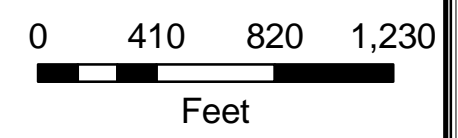
PAGE: MS-047



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

- Occupied Habitat
- Suitable (modeled) Habitat
- Unsuitable
- Suitable - Unoccupied
- Suitable - Trace
- Suitable - Low Density
- Suitable - Moderate Density
- Suitable - High Density
- Suitable - Low-Mod Density
- Suitable - Low-High Density
- Suitable - Mod-High Density

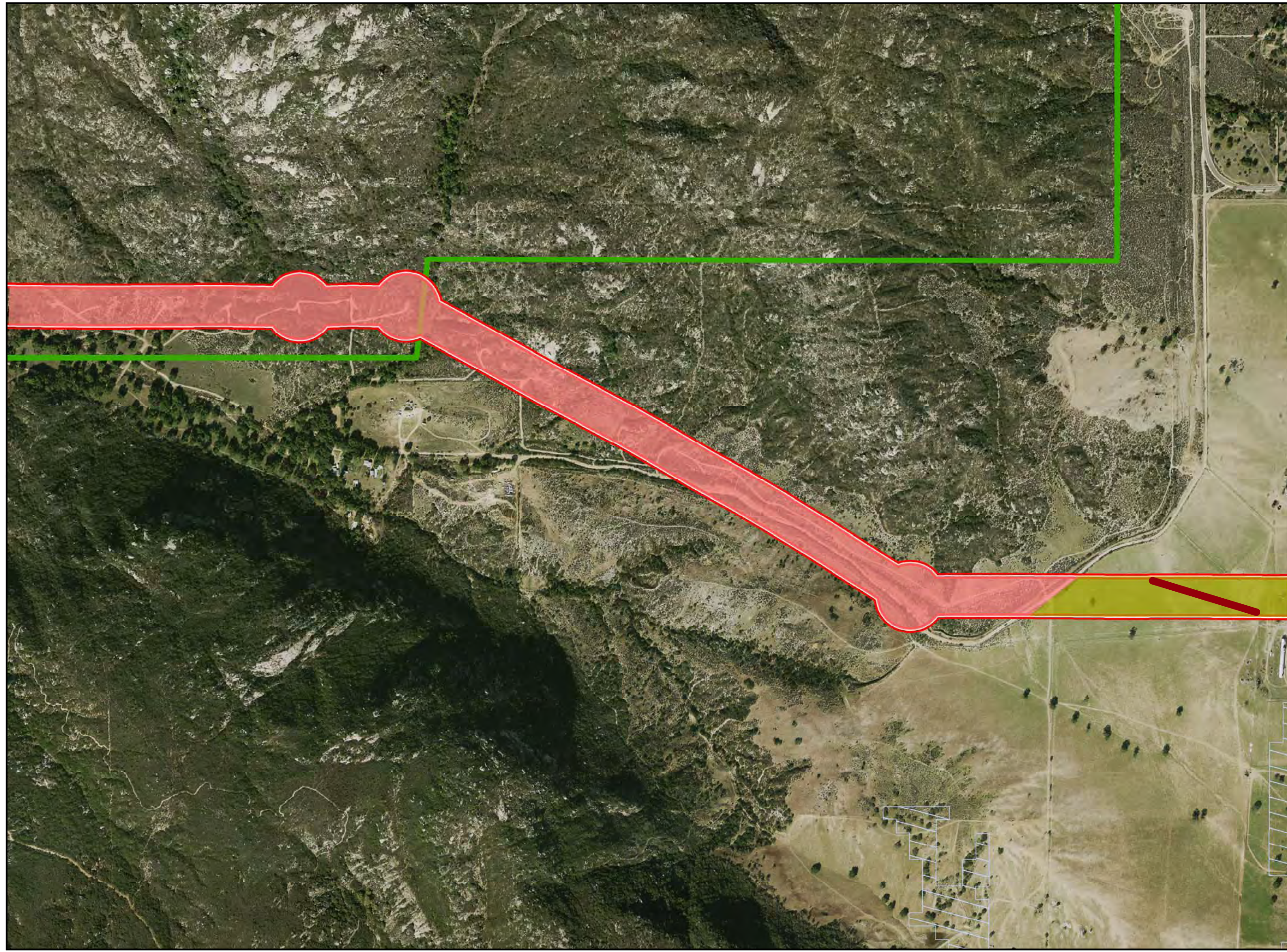


Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

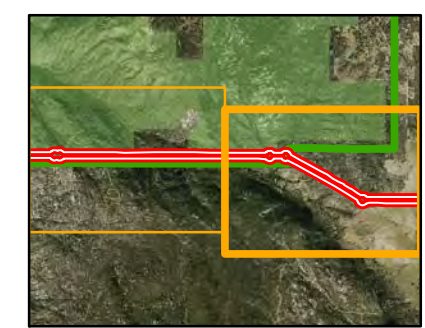
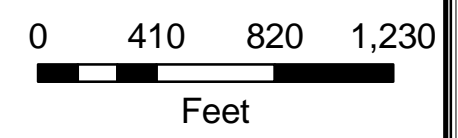
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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

- Occupied Habitat
- Suitable (modeled) Habitat
- Unsuitable
- Suitable - Unoccupied
- Suitable - Trace
- Suitable - Low Density
- Suitable - Moderate Density
- Suitable - High Density
- Suitable - Low-Mod Density
- Suitable - Low-High Density
- Suitable - Mod-High Density

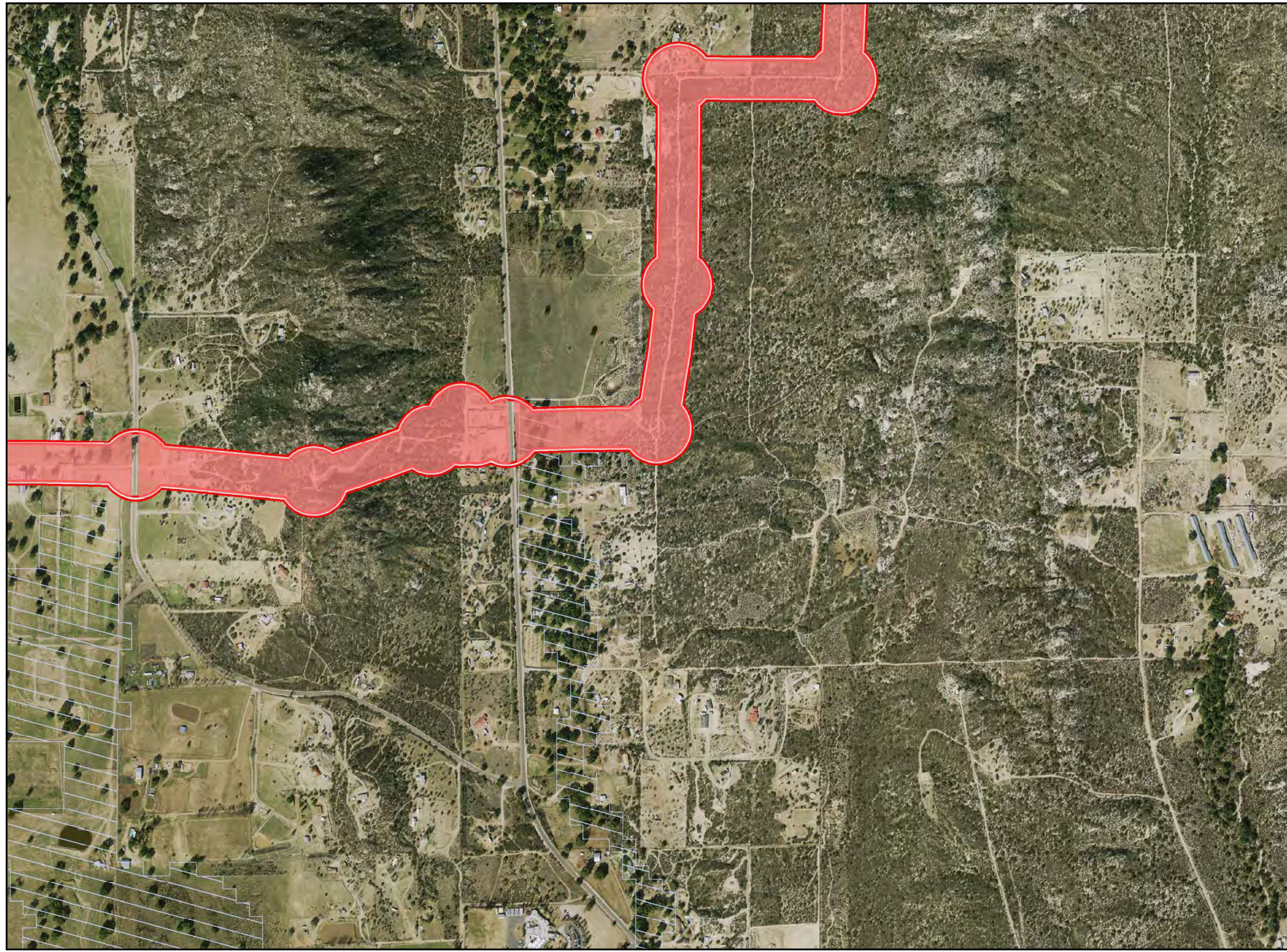





Version Date: 2-2-12














Stephen's Kangaroo Rat Survey Sites

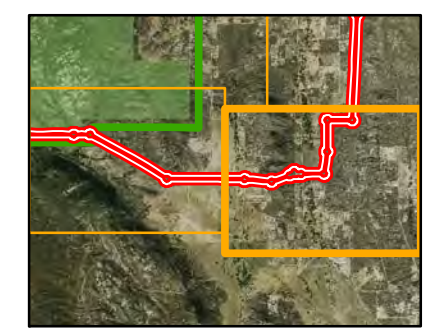
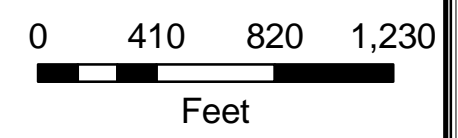
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-  Trap Line
-  Survey Area
-  Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

-  Occupied Habitat
-  Suitable (modeled) Habitat
-  Unsuitable
-  Suitable - Unoccupied
-  Suitable - Trace
-  Suitable - Low Density
-  Suitable - Moderate Density
-  Suitable - High Density
-  Suitable - Low-Mod Density
-  Suitable - Low-High Density
-  Suitable - Mod-High Density



Version Date: 2-2-12



Stephen's Kangaroo Rat Survey Sites

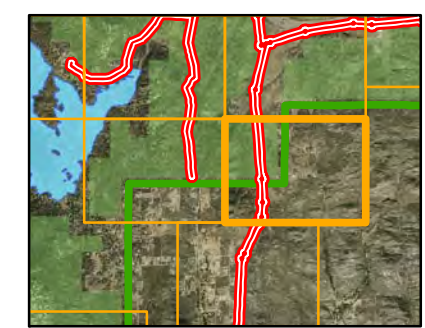
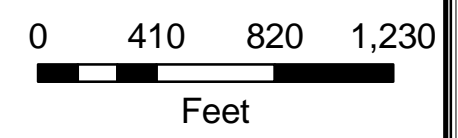
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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

Stephens' Kangaroo Rat

- Occupied Habitat
- Suitable (modeled) Habitat
- Unsuitable
- Suitable - Unoccupied
- Suitable - Trace
- Suitable - Low Density
- Suitable - Moderate Density
- Suitable - High Density
- Suitable - Low-Mod Density
- Suitable - Low-High Density
- Suitable - Mod-High Density



Version Date: 2-2-12



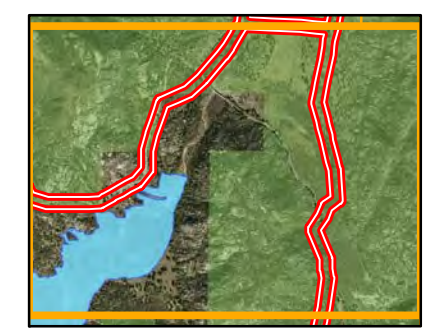
Stephen's Kangaroo Rat Survey Sites

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- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

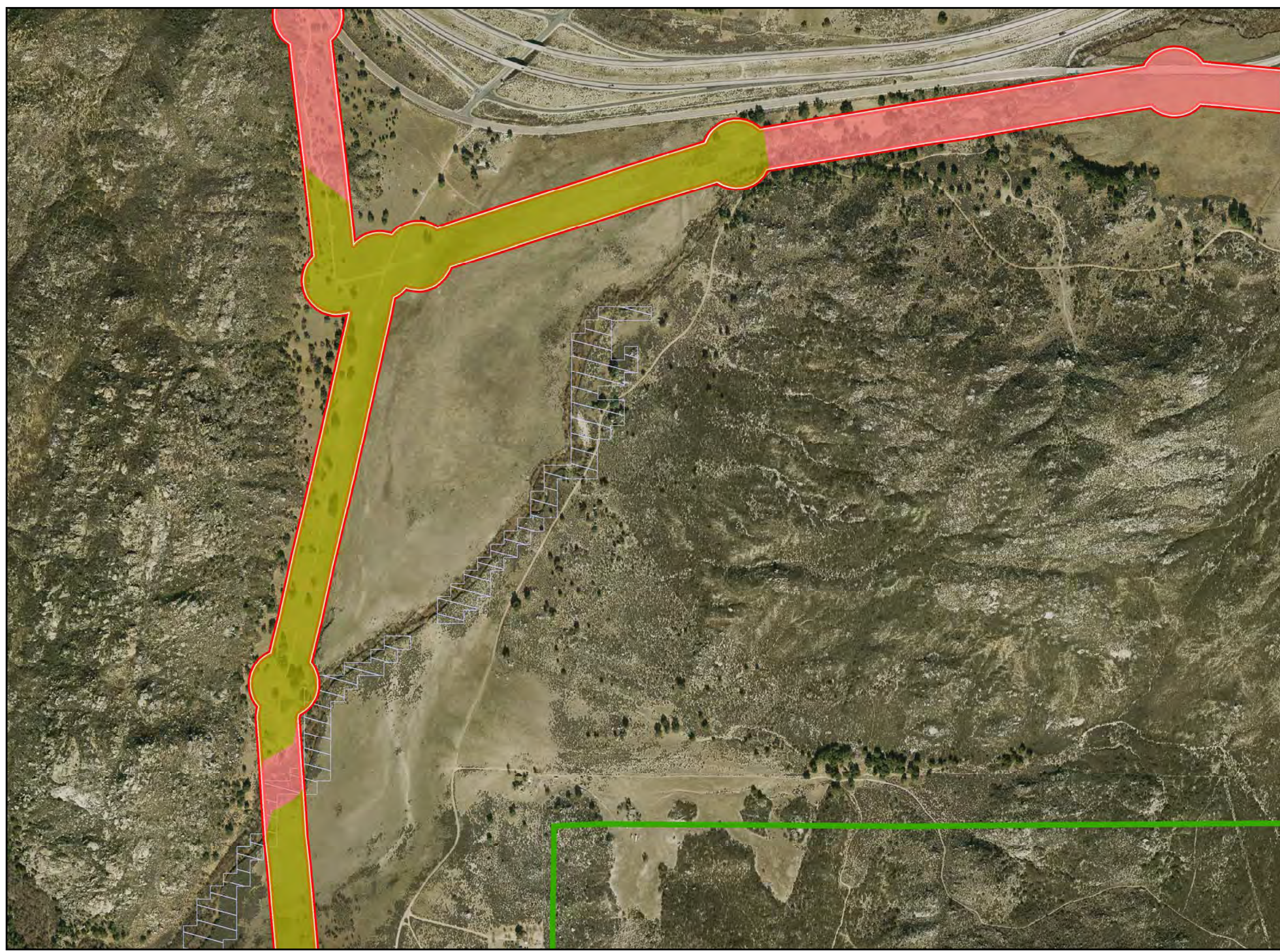


Version Date: 2-2-12



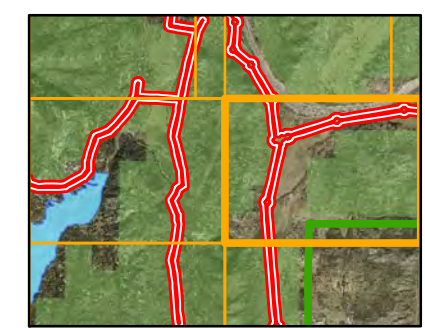
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-069



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density



Version Date: 2-2-12



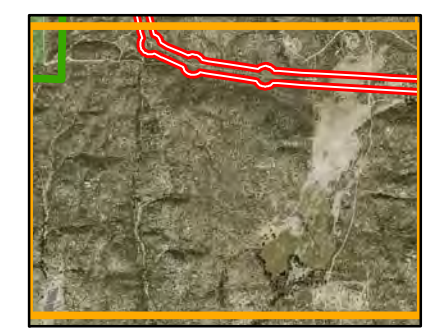
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-072



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density



Version Date: 2-2-12



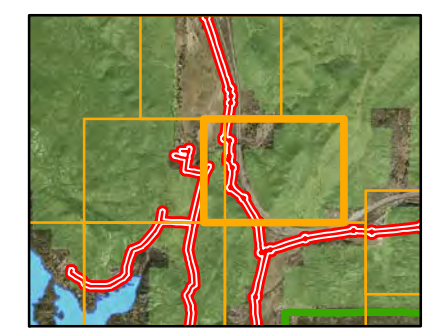
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-075



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density

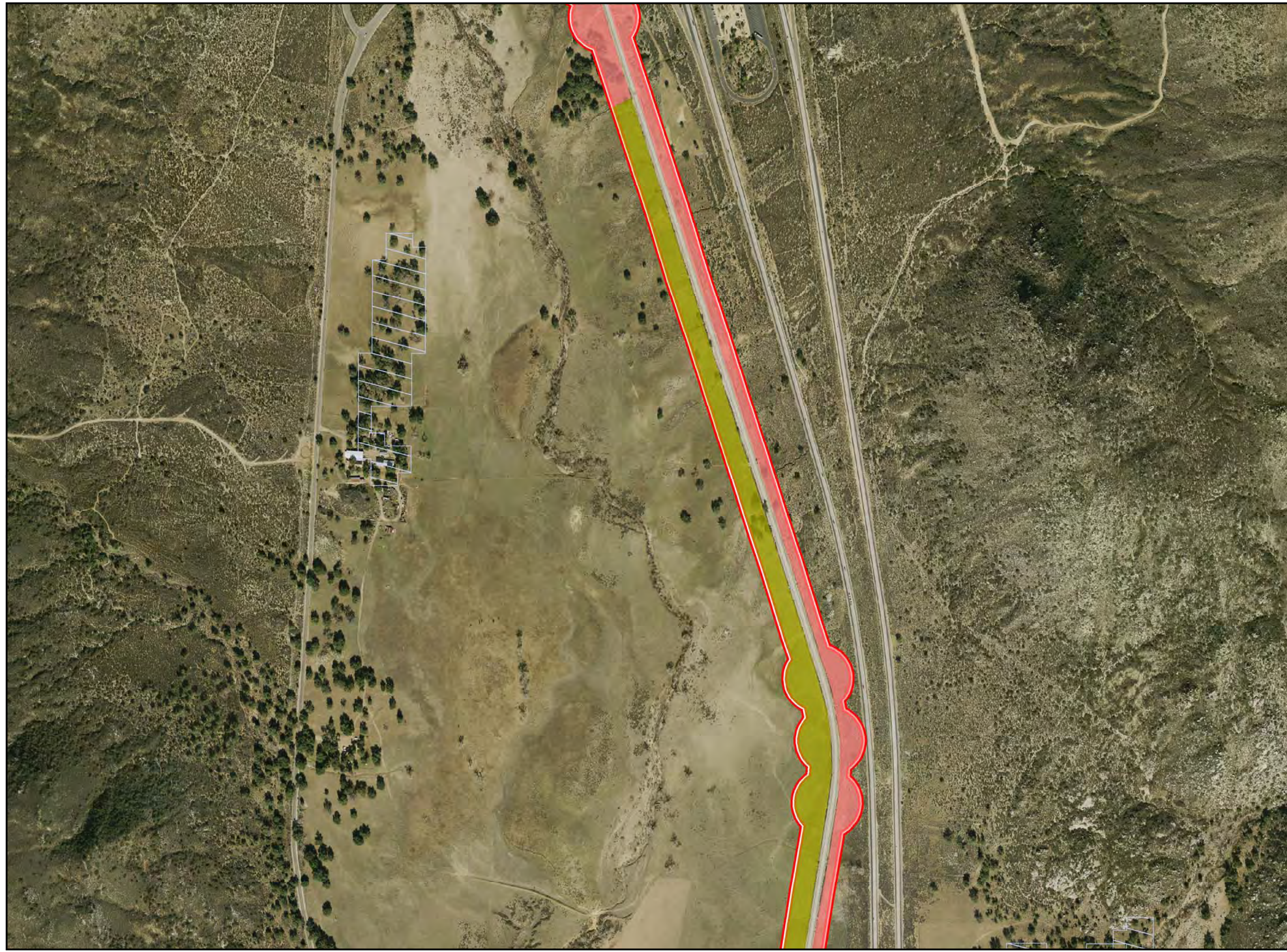


Version Date: 2-2-12



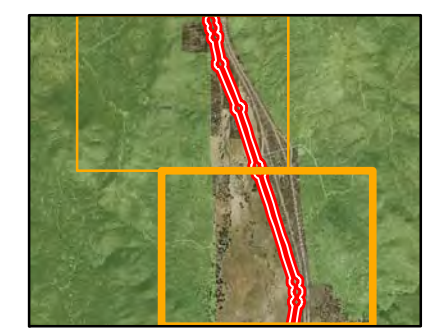
Stephen's Kangaroo Rat Survey Sites

PAGE: MS-077



- Trap Line
- Survey Area
- Cleveland National Forest Congressional District Boundary

- ### Stephens' Kangaroo Rat
- Occupied Habitat
 - Suitable (modeled) Habitat
 - Unsuitable
 - Suitable - Unoccupied
 - Suitable - Trace
 - Suitable - Low Density
 - Suitable - Moderate Density
 - Suitable - High Density
 - Suitable - Low-Mod Density
 - Suitable - Low-High Density
 - Suitable - Mod-High Density



Version Date: 2-2-12





APPENDIX B – PHOTOGRAPHS OF THE STEPHEN’S KANGAROO RAT HABITAT



Photo 1: Expansive grasslands at Lake Henshaw, location of the largest population of SKR in San Diego County.



Photo 2: First example of inter-burrow ruts in relatively dense grassland habitat, apparently created by long-term use by SKR



Photo 3: Second example of inter-burrow ruts in relatively dense grassland habitat, apparently created by long-term use by SKR





APPENDIX C – GPS COORDINATES FOR THE STEPHEN'S KANGAROO RAT TRAPPING LOCATIONS



APPENDIX C – UTM COORDINATES FOR ALL TRAP SITES

TRAP SITE	UTM (NAD 83 COORDINATES (all 11 S)
MA	0532534/3676223
MB	0531972/3676318
MC	0532517/3676030
MD	5299861/3676513
MGA	0526860/3668264
SFA	0536405/3675662
SFB	0536930/3675623
SFC	0535412/3676195
TA	0528679/3660673
TB	0528285/3660165
TC	0528045/3659990
TD	0527964/3659875
TE	0527474/3659390
TF	0527250/3659217
TG	0526204/3658095
TH	0526230/3657805
TI	0524050/3656028
TJ	0527815/3659743
TK	0527767/3659673
TL	0526227/3657924
TM	0526229/3657845
TN	0526233/3657789
TO	0526202/3657530
TP	0526188/3657472
TQ	0526157/3657330
BO	not recorded
BO	not recorded