

**Focused Survey for Desert Tortoise,
Habitat Evaluation for Burrowing Owl, and
General Biological Resource Assessment for the
Cadiz Valley Water Conservation, Recovery, and Storage Project,
San Bernardino County, California**

Job#: 10-030

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I hereby certify that the statements furnished herein, including attached exhibits, present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a nondisclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project.

Circle Mountain Biological Consultants, Inc.
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November 2011

Executive Summary

For **tortoises**, CMBC found 4 scat, 3 carcasses, and 1 burrow along the northern portion of the water conveyance pipeline within the Arizona & California Railroad Company (ARZC) right-of-way (ROW). All evidence of living tortoises was found between the north end of the ARZC ROW and Old Woman Mountains, with three carcasses found to the south. Tortoises may be absent or occur in very low densities south of Old Woman Mountains and are not common anywhere along the ARZC ROW, apparently occurring in low densities along northern reaches.

In the proposed wellfield area, evidence of *living* tortoises was restricted to Sections 17 and 18, with carcasses found in Sections 8 and 35. The carcass found in Section 35 appears to have died in the early 1940's and was the only tortoise sign found in the central and western portions of the proposed wellfield area. CMBC concludes that tortoises are most likely to be encountered in the eastern portion of the wellfield area (particularly Section 17 and 18, and perhaps Section 8) and least likely to be encountered elsewhere. Though not detected at the conceptual spreading basin area, habitats there are among the least impacted and most suitable, and tortoise(s) may occur there in the future, if not already.

None of the following **special status plant species** reported from the area would be significantly affected by Project development: White bear poppy, crucifixion thorn, las animas colubrina, Alverson's foxtail cactus, Howe's hedgehog cactus, Little San Bernardino Mountains linanthus, spear-leaf matela, Robison's monardella, short-joint beavertail cactus, white-margined beardtongue, Stephen's beardtongue, lobed ground-cherry, Orocopia sage, and Rusby's desert-mallow.

There is some unknown potential for the following plant species to occur, as they would not have been detected during CMBC's September-October 2010 surveys: small-flowered androstephium, Borrego milk-vetch, ribbed cryptantha, winged cryptantha, Utah vine milkweed, and slender cottonheads.

The following species are known to occur on or adjacent to the Project site and may therefore be adversely affected at unknown levels by Project development: Harwood's milk-vetch, barrel cactus, silver cholla, beavertail cactus, pencil cholla, desert holly, catclaw acacia, palo verde, and smoke tree.

For **washes**, CMBC has prepared a separate report and jurisdictional delineation for the +/- 70 washes crossing the ARZC ROW and others, particularly Schulyler Wash, in the proposed wellfield and conceptual spreading basin areas.

None of the following **special status bird species** reported from the area would be significantly affected by Project development: Northern harrier, sharp-shinned hawk, Swainson's hawk, ferruginous hawk, golden eagle, merlin, or long-eared owl. These species may incidentally occur in the area and occasionally forage there but none of them would nest in the Project area, so no significant impacts are anticipated. The status of western snowy plover and mountain plover within the Project area remain unknown.

Bird species encountered during CMBC's 2010 survey included: 8 burrowing owls and 32 burrows with owl sign; 6 Cooper's hawk locations; 11 prairie falcon locations; 2 LeConte's thrashers; and 20 loggerhead shrike locations plus 93 sites where diagnostic shrike pellets were found.

Insufficient information is available to determine if Project development would affect the following **special status mammal species**: California leaf-nosed bat, Arizona myotis, cave myotis, spotted bat, Townsend's big-eared bat, pocket free-tailed bat, big free-tailed bat, western mastiff bat, fringed myotis, and southern grasshopper mouse. The status of grasshopper mouse remains unknown in the Project area.

For pallid bats, the surveys were sufficient to detect more than 160 individual bats at 22 of the 70 trestles inspected. This is considered a regionally significant resource for the species.

American badgers, though not observed, appear to occur throughout all Project areas. No primary burrow systems were observed, though evidence of their foraging is ubiquitous.

Impacts are discussed and mitigation measures recommended for each of these biological resources.

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1.0. Introduction

1.1. Purpose and Need for Study. Circle Mountain Biological Consultants, Inc. (CMBC) was contacted by ESA Southern California Water Group (ESA) on behalf of Santa Margarita Water District (SMWD) to perform a focused survey for desert tortoise (*Gopherus agassizii*), habitat assessment for burrowing owl (*Athene cunicularia*), and a general biological resource assessment on the Cadiz Valley Water Conservation, Recovery, and Storage Project (Project) site located in San Bernardino County, California (see **Figures 1** and **2**). Given the location of the Project in an unincorporated portion of the County, this report has been prepared according to County of San Bernardino's *Report Protocol for Biological Assessment Reports* (County of San Bernardino 2006).

As the California Environmental Quality Act (CEQA) Lead Agency, Santa Margarita Water District (SMWD) is required to determine if site development will result in any adverse impacts to rare biological resources. The information will also be useful to federal and State regulatory agencies, including U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG), respectively, when they are asked to assess impacts associated with proposed development.

Results of CMBC's focused tortoise survey, burrowing owl habitat assessments, and general biological resource assessment are intended to provide sufficient baseline information to these and other pertinent agencies to determine if impacts will occur and to identify mitigation measures, if any, to offset those impacts.

1.2. Project Location. The Project area is located at the confluence of the Fenner Valley and Orange Blossom Watersheds which span nearly 1,300 square miles and contain an estimated total volume of groundwater in storage of more than 20 million acre feet. The Project area is underlain by an aquifer system composed of saturated alluvial materials, limestone-carbonates, and granitic rocks with a depth to groundwater of consistently more than 180 feet below ground surface (bgs) and reaching over 400 feet bgs in many areas.

Figure 1. Cadiz Project: Vicinity Map

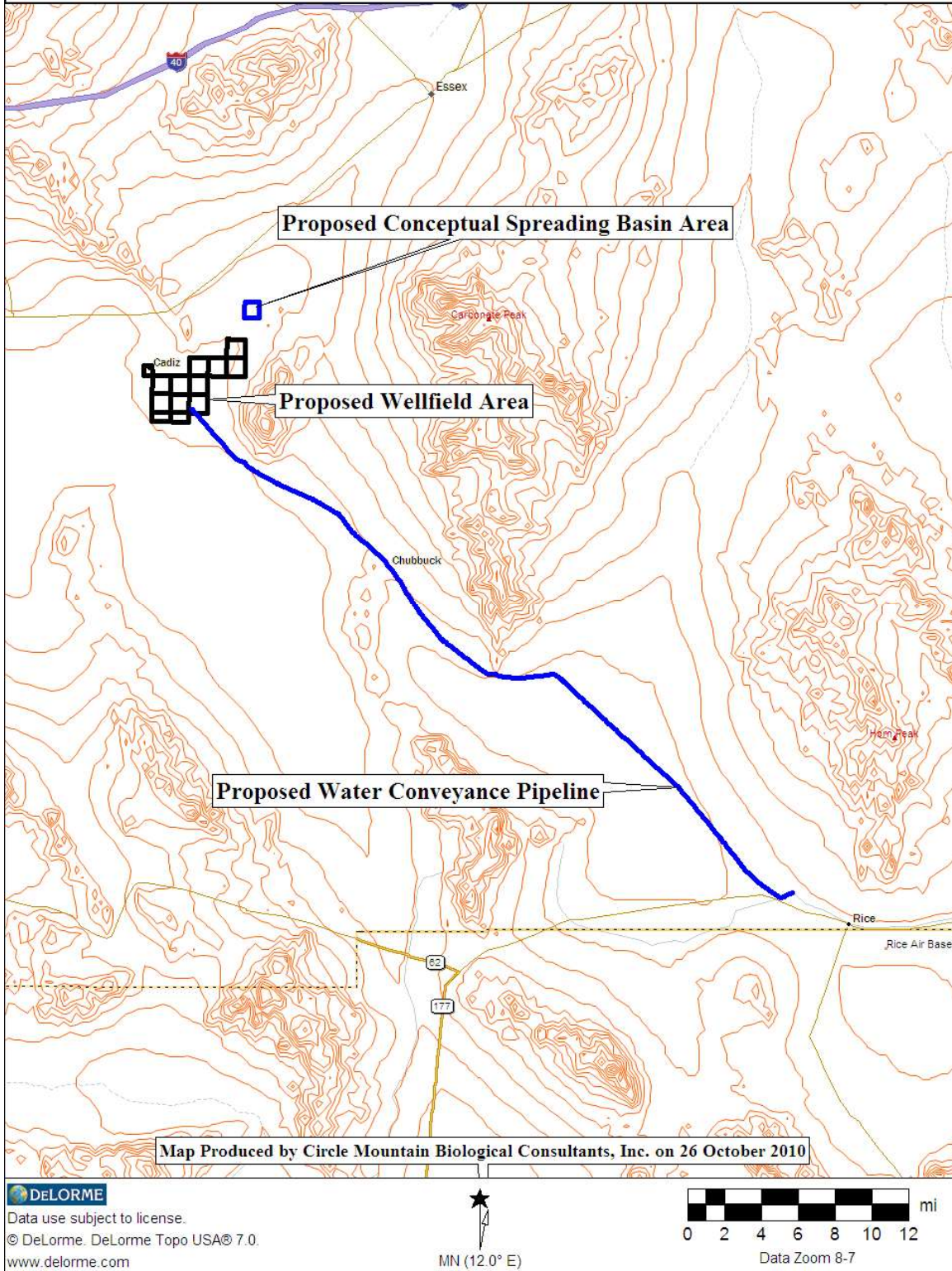
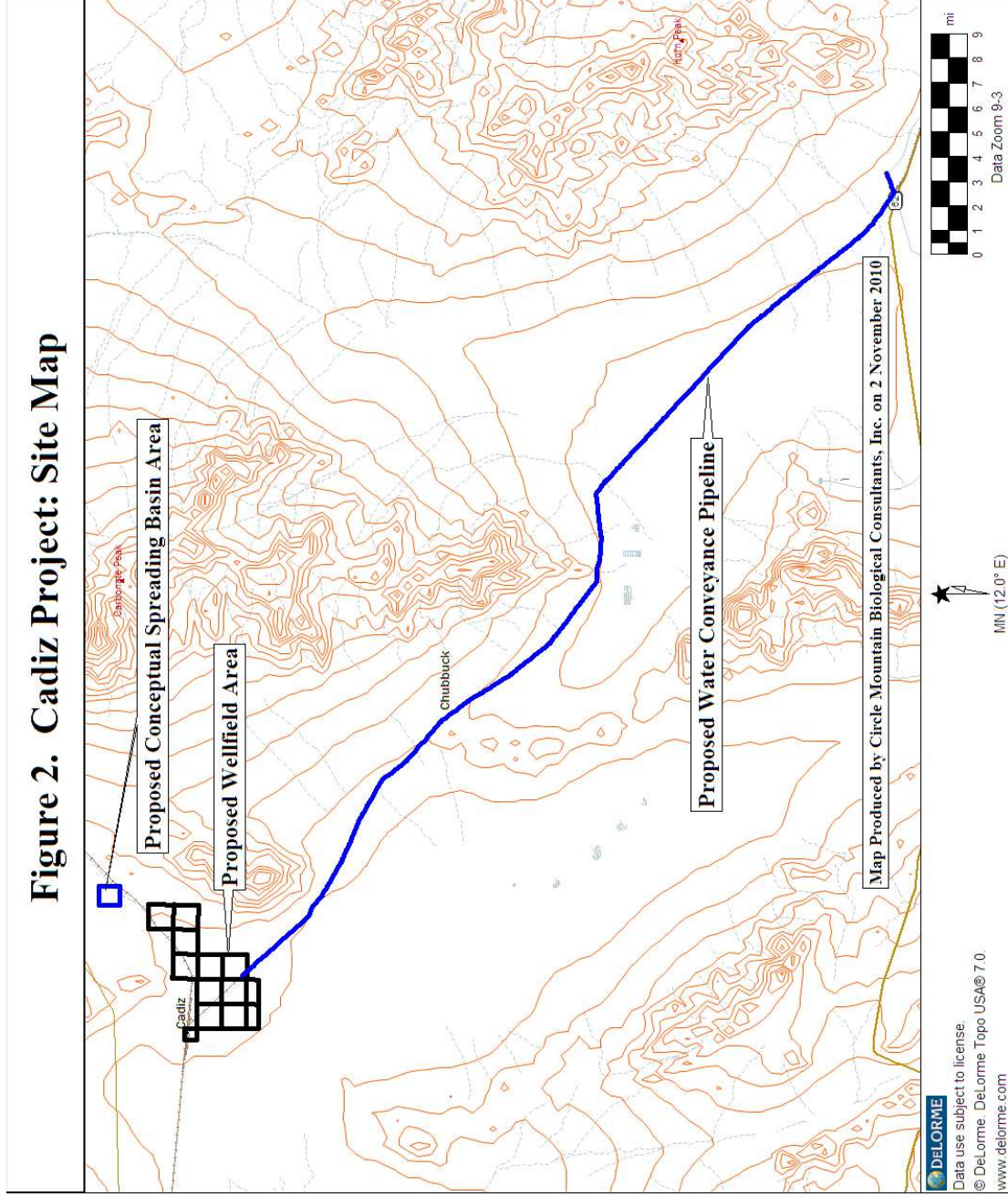


Figure 2. Cadiz Project: Site Map



1.3. Project Description. The Project proposes active management of the groundwater basin underlying Cadiz Inc. property in the Cadiz and Fenner Valleys located in the eastern Mojave Desert, San Bernardino County, California. The purpose of the Project is to enhance dry-year water supply reliability, water supply opportunities, and delivery flexibility for SMWD and other participating water providers.

The proposed Project would be executed in two phases: the first phase of the Project is the Conservation and Recovery Component, and the second phase is the Imported Water Storage Component. In the first phase, the Conservation and Recovery Component would be constructed to capture and conserve the average annual natural recharge in the Fenner and northern Bristol Valleys that would otherwise discharge to the Bristol and Cadiz Dry Lakes. Facilities that would be constructed under the first phase include a Project wellfield, water conveyance facilities (pipeline), tie-in to the Colorado River Aqueduct (CRA), access roads, and power supply and distribution facilities.

The second phase, referred to as the Imported Water Storage Component, would use the established hydraulic control for the importation, storage and recovery of imported developed water made available from the CRA. Facilities that would be constructed under the second phase include a Project wellfield expansion, extension of the water conveyance facilities, CRA diversion structure and pump station, access roads, expansion of the power supply and distribution facilities, and spreading basins. Because the Imported Water Storage Component would be implemented at a later date, it will be evaluated in the EIR on a programmatic basis. Prior to implementing the Imported Water Storage Component, it will undergo appropriate further environmental review consistent with CEQA.

Additional, extensive project description information will be included in Chapter 3 of the Draft Environmental Impact Report (Draft EIR) being prepared by ESA.

2.0. Methods

This study and technical report are provided as baseline data to support the CEQA analysis that will be included in the Draft EIR.

2.1. Agency Consultation. CMBC contacted CDFG Wildlife Biologist, Jim Sheridan,¹ to inquire about appropriate survey protocol. Mr. Sheridan provided limited input on desert tortoise surveys, referring CMBC to the 2010 survey protocol (U.S. Fish and Wildlife Service 2010). Mr. Sheridan did agree with the current approach for burrowing owl, which was to assess habitats now and eventually perform focused spring surveys for breeding burrowing owls.

USFWS Wildlife Biologist Judy Hohman² was also contacted to obtain information regarding survey methodologies. Ms. Hohman recommended that the various project components (including staging areas, haul routes, etc.) be evaluated together as one project in order to address the need of a well defined action area.

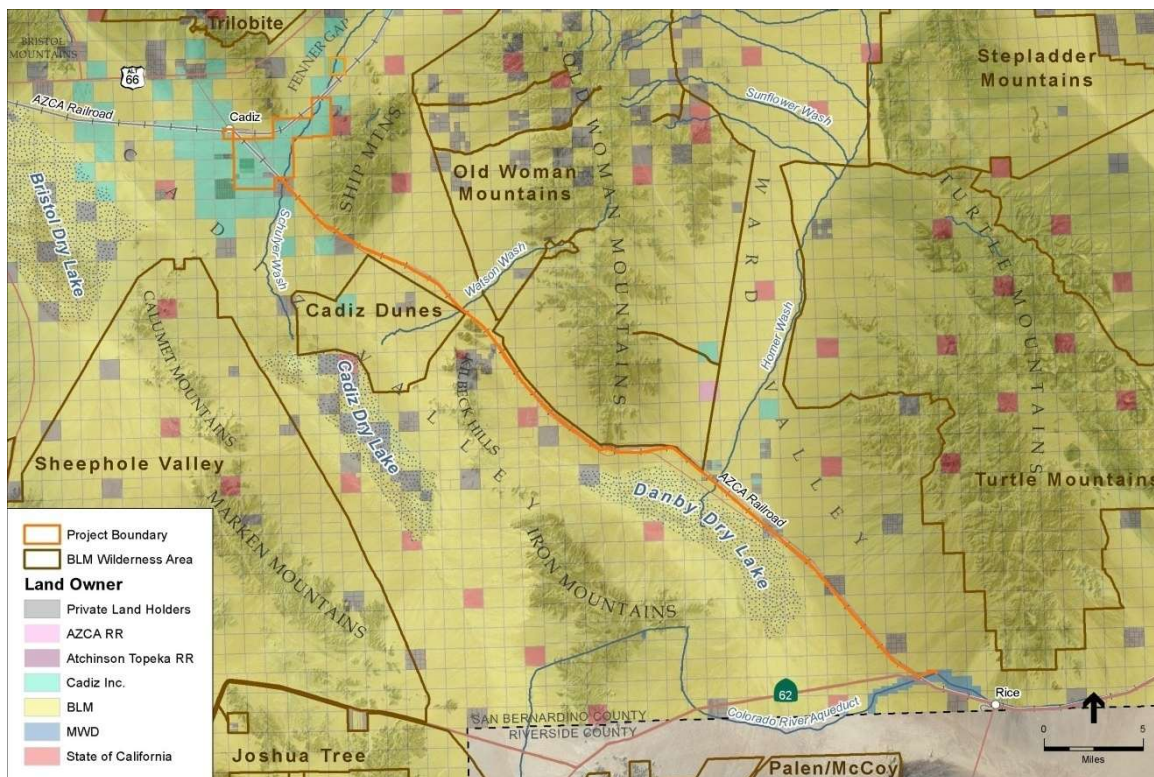
It was determined that the action area will include direct impact areas associated with the well sites throughout the wellfield areas, the interconnecting pipes between the well sites, the water conveyance pipeline, and ancillary facilities located in these areas, indirect impacts are more difficult to assess. At a maximum, the action area could include the 11 square miles encompassing the wellfield areas and the 390-acre± conceptual spreading basin area; at the minimum, the action area would include the direct impact area plus a minimal buffer adjacent to the constructed facilities. In reality, the action area is somewhere in between. Field survey methodologies used for this study were distributed throughout the maximum action area so that potential impacts to biological resources could be evaluated in the Draft EIR.

Although the region is mostly comprised of public lands managed by the Bureau of Land Management (BLM) (**Figure 3**), no public lands will be directly impacted by this project. Construction of the water conveyance pipeline, wellfield, spreading basins and associated pipelines, and other project facilities would occur on private property and rights-of-way. As such, there is no BLM involvement and BLM biologists were not contacted prior to surveys. BLM Wildlife Biologist, Dr. Larry LaPre was contacted via email on 3 November 2010 concerning cattle grazing in the region with his response on 4 November 2010.

¹ Personal correspondence with Jim Sheridan, CDFG Bermuda Dunes Office, on 27 September 2010.

² Personal correspondence with Judy Hohman, USFWS, on 14 September 2010, 26 and 27 October 2010.

Figure 3. Regional Land Ownership



2.2. Literature Review. CMBC consulted materials included in our library to determine the nearest desert tortoise locations and other special status plant and animal species that have been reported from the vicinity of the subject property. Of particular relevance was CMBC’s 1999 focused tortoise surveys of the then-proposed Cadiz pipeline, which shared the same ROW between the community of Cadiz and Chubbuck as the current pipeline alignment where it then turned southwest through the Kilbeck Hills, unlike the current pipeline alignment, which stays within the ARZC ROW. ESA provided CMBC with an updated review of the California Natural Diversity Data Base (CDFG CNDDDB 2010b) for the following USGS-designated 7.5’ quadrangles: Arica Mountains, Cadiz Summit, Cadiz Lake Northwest, Cadiz Lake Northeast, Chubbuck, Milligan, East of Milligan, Danby Lake, and Sablon. These and other materials used in the completion of this report are listed in Section 5.0, below.

2.3. Field Survey. For **desert tortoises**, the survey protocol first identified by the USFWS (1992) and recently revised (USFWS 2010) for their detection recommends that transects be surveyed at 30-foot intervals throughout the project impact area. If neither tortoises nor sign are encountered during *action area* surveys and the project, or any portion of project, is $\leq 0.8 \text{ km}^2$ (200 acres) or linear, three additional 30-foot (9 meters) belt transects at 655-foot (200 meters), 1,310-foot (400 meters), and 1,970-foot (600 meters) intervals parallel to and/or encircling the project perimeter should be surveyed.

The proposed water conveyance pipeline would be situated within the 200-foot wide ARZC ROW between the community of Cadiz to the north and Highway 62 to the south (Figures 1 and 2). Since it is too soon to know which side of the rail line would be used, *both* sides were surveyed out to 100 feet. This entailed survey of three transects, spaced at 30-foot intervals on both sides of the the railroad tracks. Since tortoise sign was found (see **Table 1**) within 100 feet on either side of the northern 25 miles of the proposed pipeline (**Figure C1** in Appendix C), zone of influence transects were surveyed at 655-, 1,310-, and 1,970-foot intervals on both sides of the southern 20 miles as depicted on the next page, in **Figure 4**. The $\frac{3}{4}$ -mile stretch of the underground CRA between the southern terminus of the ROW and east to where the CRA surfaces was surveyed along 6 transects spaced at 30-foot intervals.

For wellfield areas, following suggested protocol methodologies would have resulted in the grid pattern shown in the lower half of **Figure 5** on page 11. Although it would have provided even coverage, much of the area would not have been surveyed. So that better coverage would be provided and to implement methodologies consistent with burrowing owl surveys described below, CMBC opted to programmatically survey each of the 10 640-acre sections, the 2 320-acre half-sections, the 160-acre parcel, and the 390-acre conceptual spreading basin area along transects spaced at 100-foot intervals. A 410-acre area encompassing the conceptual spreading basins was actually surveyed. As shown in Figure 6, this resulted in surveys of 54 linear miles within each square mile rather than 42 linear miles that would have been covered following the standard protocol.

Given that a Draft EIR is being prepared to address the Conservation and Recovery Component at a project level and the Imported Water Storage Component at a programmatic level, and that there will be ample opportunities to perform more detailed surveys later, this methodology was judged to be more appropriate for current surveys of the action area than would have been provided by implementing the suggested protocol.

Figure 4. Transect Locations Along the Proposed Pipeline Alignment

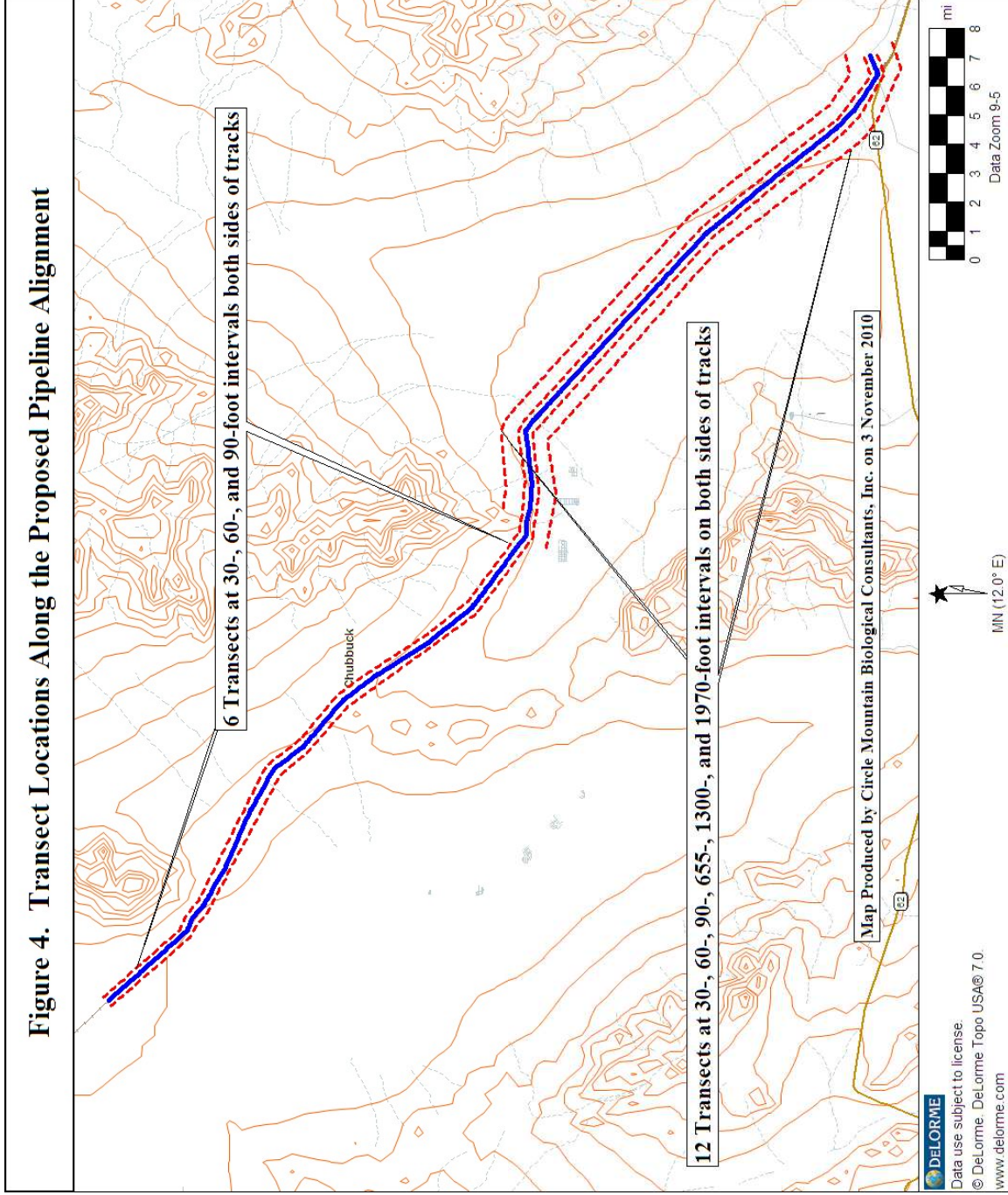
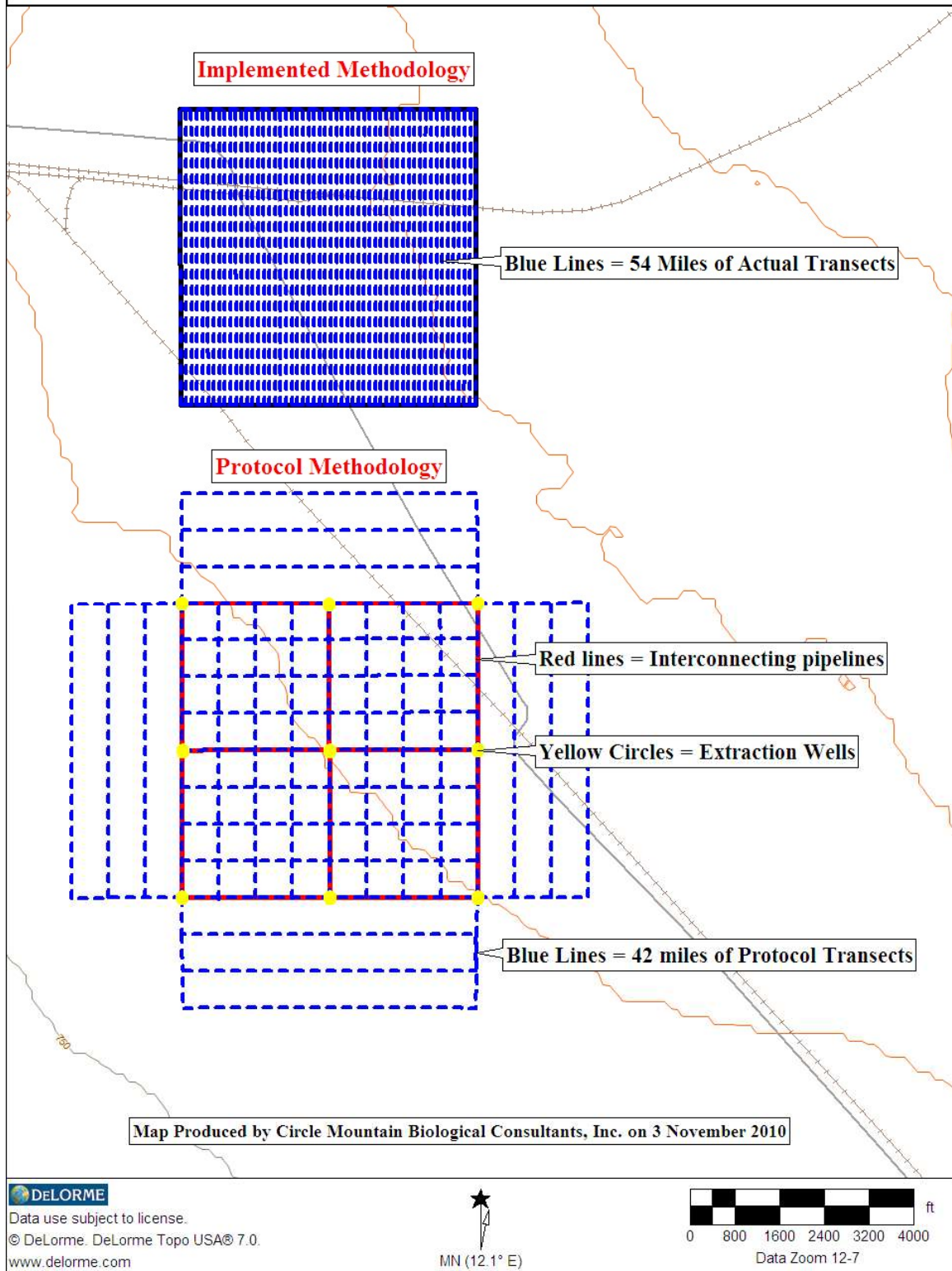


Figure 5. Variable Transect Coverages at Wellfield Areas



For **burrowing owl**, the CDFG (1995) survey protocol recommends transects be surveyed at 100-foot (30-meter) intervals throughout a given site with five transects spaced at 100-foot intervals surveyed in adjacent areas in potential habitat (i.e., excluding areas substantially developed for commercial, residential, industrial, etc. purposes). The transect interval used for this study was ideal for detecting burrowing owls.

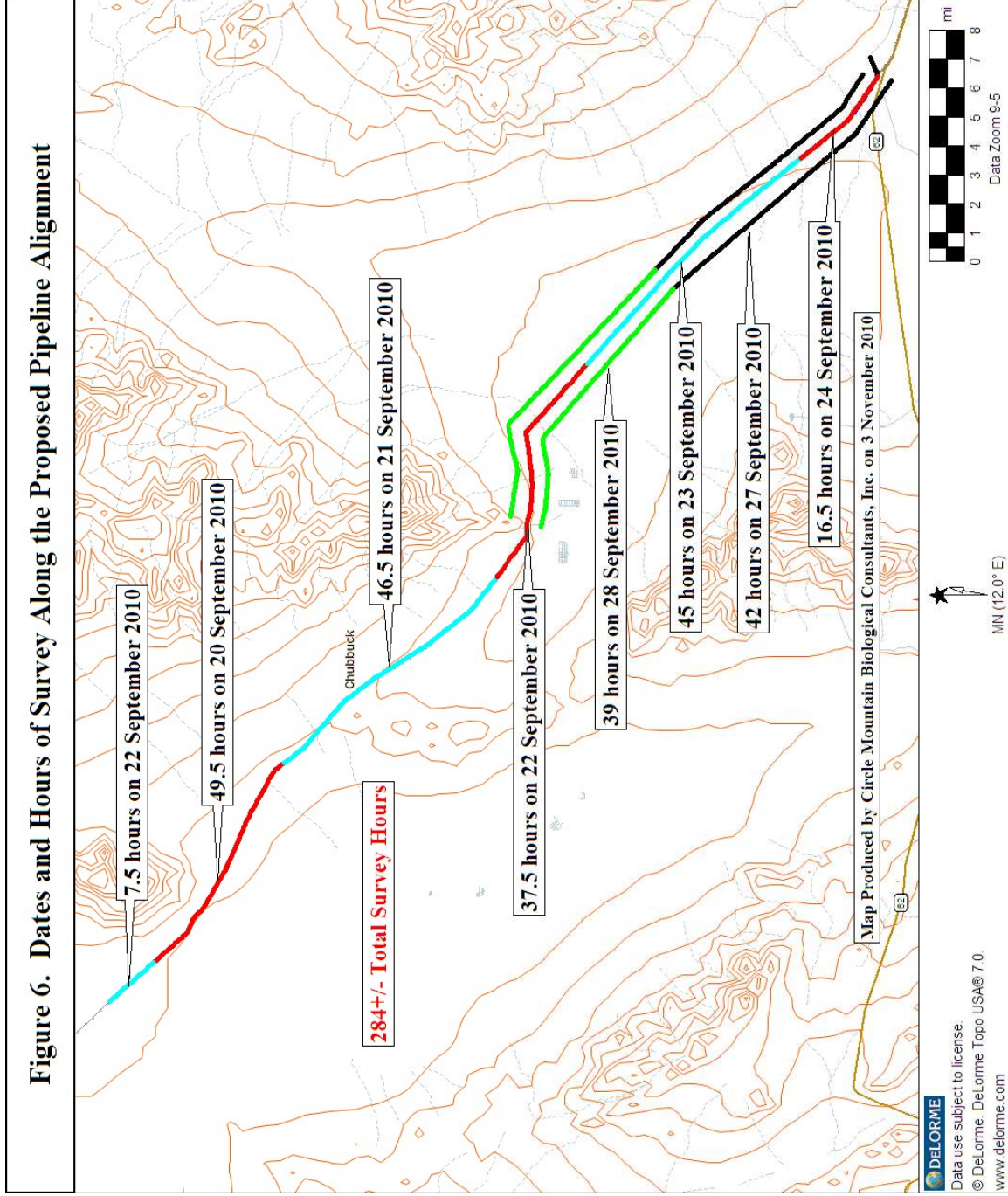
Importantly, this methodology is considered a formal *Phase I and Phase II habitat assessment* for presence of burrowing owls, which can be conducted any time of the year. Field surveys revealed four types of burrows that may be occupied by burrowing owls: larger rodent colonies (Exhibits I11 and I12 in Appendix I), inactive kit fox dens (Exhibit I10), badger digs (Exhibit I7-I8), and single-entrance burrows created by an unknown source (ambiguous burrows likely created by badger or kit fox) (Exhibit I9). When found, each burrow was visually inspected for owl sign and coordinates were taken, which allowed us to map all burrows, including those with obvious owl sign (see **Figures D1-D25** in Appendix D).

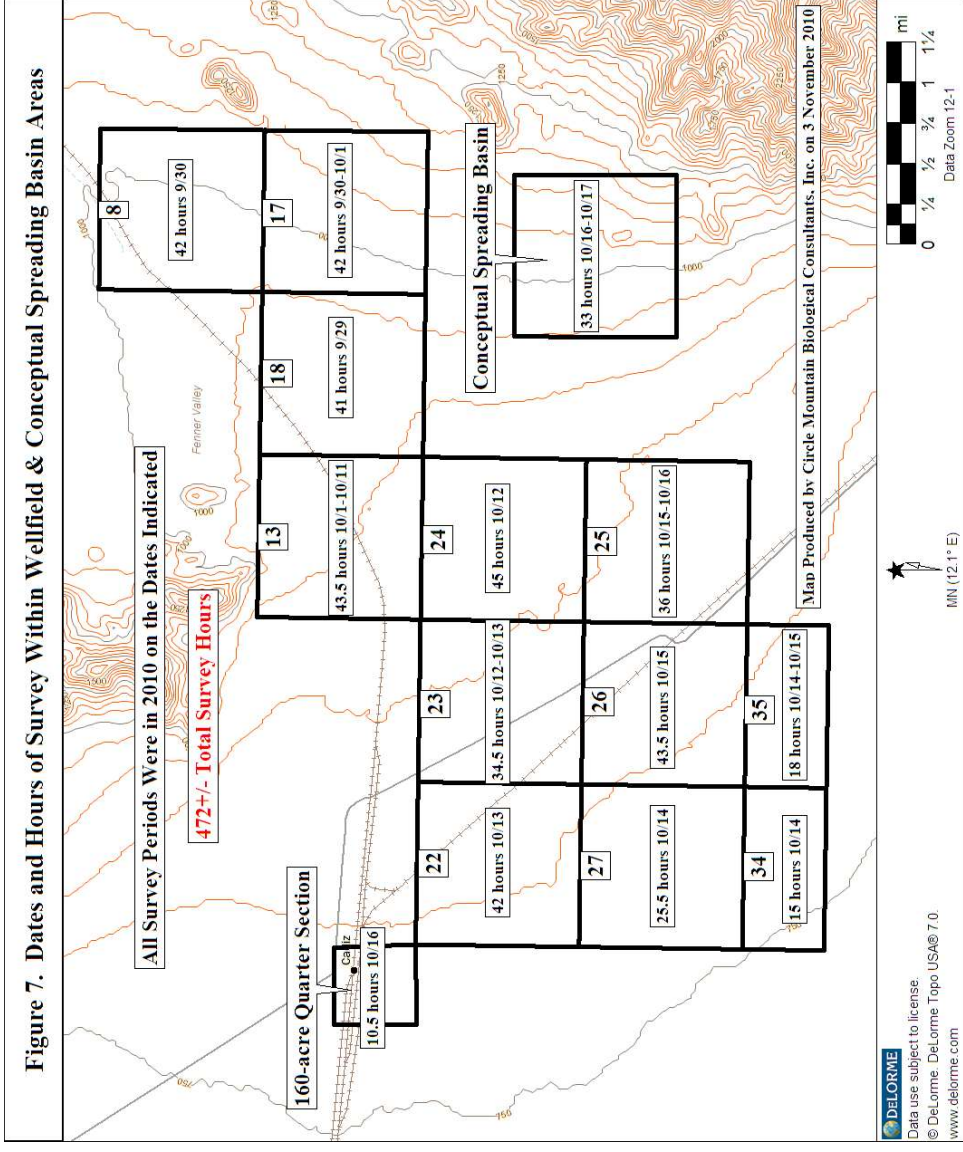
For surveys within the ARZC ROW, for a total of 284 hours, between 20 and 28 September 2010, Ed LaRue of CMBC and subcontractors, Patricia Seamount, Michael Gallagher, Mike Radakovich, Bill Donnan, Shawn Gonzales, and Gary Thornbrugh, surveyed the ARZC ROW and adjacent areas as depicted below in **Figure 6**. The same surveyors, with the addition of Sharon Dougherty on 29 September 2010, spent a total of approximately 472 hours between 29 September and 17 October 2010 surveying transects throughout the 11 square miles encompassing the wellfield areas, the 160-acre parcel to the northwest, and the 410-acre conceptual spreading basin area as depicted in **Figure 7**.

As transects were surveyed in the wellfield areas, LaRue kept tallies of observable human disturbances encountered on each of the transects he surveyed within each 640-acre wellfield section and the conceptual spreading basin area. The results of this method provide *encounter rates* for observable human disturbances. For example, two roads observed on each of 20 transects would yield a tally of 40 roads (i.e., two roads encountered 20 times). Habitat quality, adjacent land uses, and this disturbance information are discussed below in Section 3.2 relative to the potential occurrence of desert tortoise and other special status species on and adjacent to the Project site.

All plant and animal species identified during the surveys were recorded in field notes and are listed in Appendices A and B, respectively. Biologists used various hand-held, global positioning system (GPS) units to survey straight transects and record Universal Transverse Mercator (UTM) coordinates (North American Datum – NAD 83) for property boundaries, rare species locations, burrow locations, and other pertinent information. A digital camera was used to take representative photographs (Appendices G, H, I), with locations and directions of exhibits shown in corresponding appendices.

Figure 6. Dates and Hours of Survey Along the Proposed Pipeline Alignment





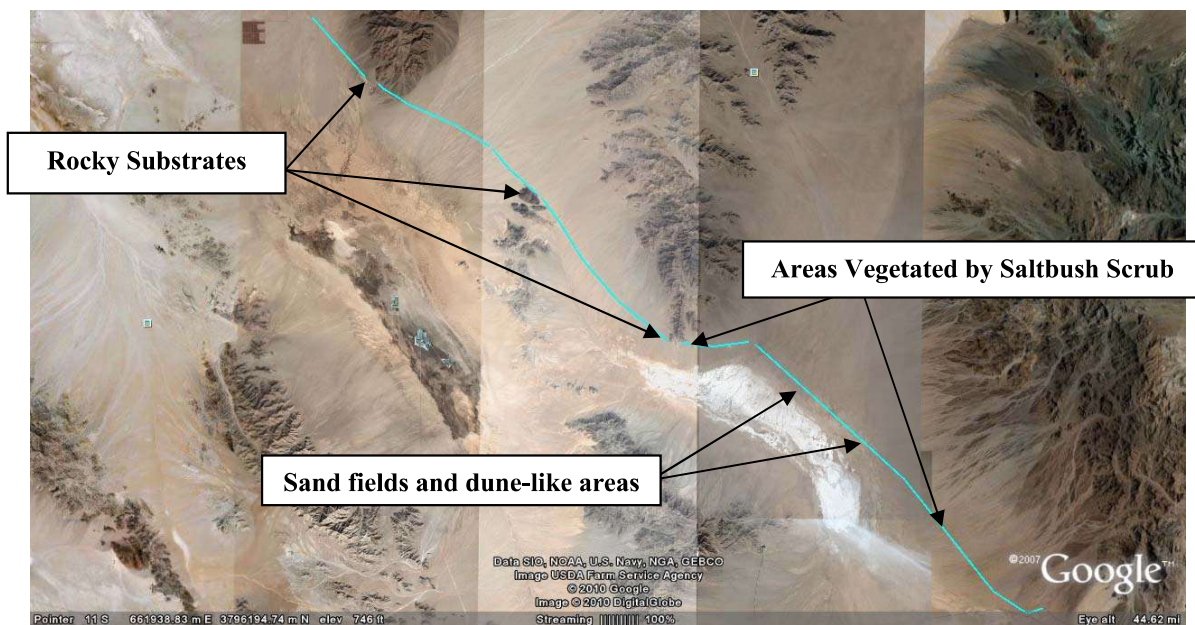
Although the conceptual spreading basin is located a mile north of Section 8 (see Figures 1 and 2 for actual location), it is repositioned in Figure 7 and several others to facilitate reporting.

3.0. Results

3.1. Common Biological Resources. The common plant and animal species identified during the survey are influenced by multiple factors such as elevation, topography, soil substrates, and adjacent land uses. Based on DeLorme Topo USA® 7.0 software, elevations along the pipeline ROW range from approximately 830 feet (253 meters) at the north end down to 640 feet (195 meters) east of Danby Lake back up to 950 feet (290 meters) where the pipeline terminates at the CRA. The wellfield areas range from 750 feet (229 meters) at the southwest corner of Section 34 up to 1,150 feet (351 meters) at the southeast corner of Section 17. The elevation near the center of the conceptual spreading basin is approximately 1,080 feet (329 meters). These variable elevations likely contribute to the presence of tortoise sign to the north and south of the water conveyance pipeline ROW and the apparent absence of living tortoise sign (e.g., burrows, carcass, scat, etc.) south of Old Woman Mountain, particularly in the vicinity of Danby Lake.

Although the wellfield areas are mostly uniformly vegetated by creosote bush scrub, variable elevations have influenced the plant communities occurring along the 44-mile long ARZC ROW, as depicted below in **Figure 8**. The northern and southern reaches of the pipeline are vegetated by creosote bush scrub while the lower elevation areas east of Danby Lake are vegetated by saltbush scrub communities. The rocky substrates associated with Ship Mountains to the north, Kilbeck Hills to the north, and Old Woman Mountains near the center provide substrates where cactus species and several other perennial plants are completely confined or relatively more common. Prevailing winds from the west associated with Danby Lake have created sandfields where Mojave fringe-toed lizards were observed and are likely restricted.

Figure 8. Plant Communities and Substrates along Pipeline Alignment



A separate jurisdictional waters analysis has been completed as an independent report that provides extensive details of drainages and washes in the project area. In summary, there are approximately 70 washes and drainages crossing the pipeline alignment. All of these streams flow east-to-west, and in many places have created washes and washlets along the eastern side of the ARCZ railroad. This flow of water impeded by the existing rail line has resulted in a zone of more frequent perennial plants (Exhibit I19 in Appendix I), including wash-adapted species described in Section 3.1.1., below. Most of these washes are associated with trestles beneath the train tracks (Exhibits I19, I20, and I21), which serve as focal points for many common and several sensitive animal species. A dozen washes also cross the wellfield areas, with Schulyler Wash comprising a regional resource that crosses the conceptual spreading basin area and 7 of the 11 square miles encompassing the wellfield.

3.1.1. *Common Flora.* The 106 plant species identified during the survey are listed in Appendix A. Common species in upland areas, which are vegetated by creosote bush scrub throughout the wellfield areas, the northern portions of the pipeline alignment north of Old Woman Mountains, and southern reaches of the pipeline alignment south of Danby Lake include creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), cheesebush (*Hymenoclea salsola*), desert tea (*Ephedra californica*), honeysweet (*Tidestromia oblongifolia*), white rhatany (*Krameria grayi*), and big galleta (*Pleuraphis rigida*).

There are three places where substrates along the ARZC ROW are influenced by the proximity of mountainous areas, which in turn support several plant species that are entirely restricted to those areas or nearly so. The two main influences are Ship Mountains to the north and Old Woman Mountains near the center, with Kilbeck Hills in the vicinity of Chubbuck having somewhat less influence. The three cactus species – barrel cactus (*Ferocactus cylindraceus*), silver cholla (*Opuntia echinocarpa*), and beavertail cactus (*Opuntia basilaris*) – are more common in these areas than elsewhere. These species are also present in the wellfield areas, with the addition of pencil cholla (*Opuntia ramosissima*), which was not observed within the ARZC ROW.

There is a 10-mile± stretch of the pipeline alignment located east of Danby Lake, south of Old Woman Mountains that is comprised of saltbush scrub. Soils are more alkaline, elevations are relatively low, and prevailing winds from the west have resulted in sand fields and dune-like areas. Dominant plants in the saltbush scrub community, several of which are not found elsewhere in the Project area, include four-winged saltbush (*Atriplex canescens*), allscale (*Atriplex polycarpa*), desert holly (*Atriplex hymenelytra*), and Torrey's sea-blight (*Suaeda moquini*). Dicoria (*Dicoria canescens*), desert Spanish needles (*Palafoxia linearis*), devil's lantern (*Oenothera deltoides*), plicate coldenia (*Tiquilia plicata*), desert camas (*Zidagenus brevibracteatus*), and desert lily (*Hesperocallis undulata*) are relatively more common in the sand field areas or sandier portions of the Project area than in rocky and less sandy areas.

As previously mentioned, there are approximately 70 drainages and dry washes along the pipeline alignment and a dozen more, including Schulyler Wash, in the proposed wellfield and spreading basin areas that support mesic-adapted plant species, many of which are not found in upland areas. There are both well-developed, sandy-bottomed washes (Exhibits I19, I20, and I21) and less well developed, upland washes (Exhibit I22) that channel rainwater moving east-to-west through both the pipeline alignment and wellfield areas. Dominant perennials occurring alongside the well-developed washes include several species of milkweeds (*Asclepias* spp.), sweetbush (*Bebbia juncea*), rayless encelia (*Encelia frutescens*), arrow weed (*Pluchea sericea*), desert willow (*Chilopsis linearis* ssp. *arcuata*) (only in a few wellfield areas), bladderpod (*Isomerus arborea*), ditaxis (*Ditaxis neomexicana*), catclaw acacia (*Acacia greggii*), palo verde (*Cercidium floridum*) (south of Old Woman Mountains), smoke tree (*Psoralea argemone*), desert lavender (*Hyptis emoryi*), sandpaper plant (*Petalonyx thurberi*), and Cooper's strangler (*Orobanche cooperi*).

Finally, there is a cohort of weedy natives and non-native plants that are present because of past and persisting disturbances in the area. Some of these, including saltcedar (*Tamarix ramosissima*) and athel (*Tamarix aphylla*), were intentionally planted and persist at some of the railroad communities mostly active between 1920 and 1950 (De Kehoe 2007). According to De Kehoe, local railroads were built in 1910 and General Patton performed extensive, invasive ground maneuvers throughout the area, south of the Burlington Northern Santa Fe Railroad (BNSF) in the early 1940's. The wellfield area in Section 27 is either currently planted in lime groves or has been substantially altered by previous agricultural uses (Figure D1 in Appendix D). The following invasive species were identified in the area and are indicative of moderately-to-heavily degraded habitats: velvet rosettes (*Psathyrotes ramosissima*), Saharan mustard (*Brassica tournefortii*), tansy (*Descurainia pinnata*), flixweed (*Descurainia sophia*), London rocket (*Sisymbrium irio*), Russian thistle (*Salsola tragus*), red-stemmed filaree (*Erodium cicutarium*), little trumpet (*Eriogonum trichopes*), Jimsonweed (*Datura wrightii*), and puncture vine (*Tribulus terrestris*).

3.1.2. *Common Fauna.* The 17 reptile, 53 bird, and 13 mammal species identified during the survey are listed in Appendix B. This list represents a diverse assemblage of reptile species, likely due to the variable habitats ranging from rocky bajadas at Ship and Old Woman mountains, to sand fields proximate to Danby Lake, supporting both creosote bush and saltbush scrub communities. As usual, side-blotched lizard (*Uta stansburiana*) and western whiptail (*Cnemidophorus tigris*) were the most commonly encountered lizard species, although desert iguana (*Dipsosaurus dorsalis*), desert horned lizard (*Phrynosoma platyrhinos*), and long-nosed leopard lizard (*Gambelia wislizenii*) were frequently encountered or detected by diagnostic scat.

Zebra-tailed lizards (*Callisaurus draconoides*) are most common in sandy wash areas and common chuckwallas (*Sauromalus obesus*) are restricted to rocky, cobble-strewn substrates. Long-tailed brush lizard (*Gambelia wislizenii*) and desert spiny lizard (*Sceloporus magister*) were only encountered in the vicinity of train trestles or at bundles of railroad ties stockpiled along the western side of the ARZC ROW. Sidewinders (*Crotalus cerastes*) were occasionally observed and commonly detected throughout both the ARZC ROW and wellfield areas. A single western banded gecko (*Coleonyx variegatus*) was observed in Section 25, which is a common species rarely encountered during daylight hours.

The 53 bird species include a diverse array of species that are resident to the area, incidental seasonal visitors or migrants, and those that are only present because they are attracted to vineyards, orchards, and water sources not often found in remote desert areas. Common year-round residents that likely nest in the area include red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), chukar (*Alectoris chukar*) (only in mountainous areas), Gambel's quail (*Callipepla gambelii*) (mostly in washes), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flavipes*), rock wren (*Salpinctes obsoletus*) (in mountainous areas), and black-throated sparrow (*Amphispiza bilineata*), among a few others.

Although there are a few species typically associated with or benefitted by human development, including killdeer (*Charadrius vociferus*), Eurasian collard-dove (*Streptopelia decaocto*), common barn owl (*Tyto alba*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), house finch (*Carpodacus mexicanus*), Brewer's blackbird (*Spizella breweri*), and great-tailed grackle (*Quiscalus mexicanus*), there are other species that would not occur in the area if not for the agricultural resources mentioned above.

Such species included a white pelican (*Pelecanus erythrorhynchos*) carcass (Exhibit I23) found near the existing spreading basins in Section 13; a common loon (*Gavia immer*) (Exhibit I24) found between the front tires of one of our vehicles in Section 27; mallard (*Anas platyrhynchos*), American avocet (*Recurvirostra americana*), red-winged blackbird (*Agelaius phoeniceus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Most of the other species listed in Appendix B are either rare (see Section 3.2.2. below), seasonal visitors, or incidental migrants.

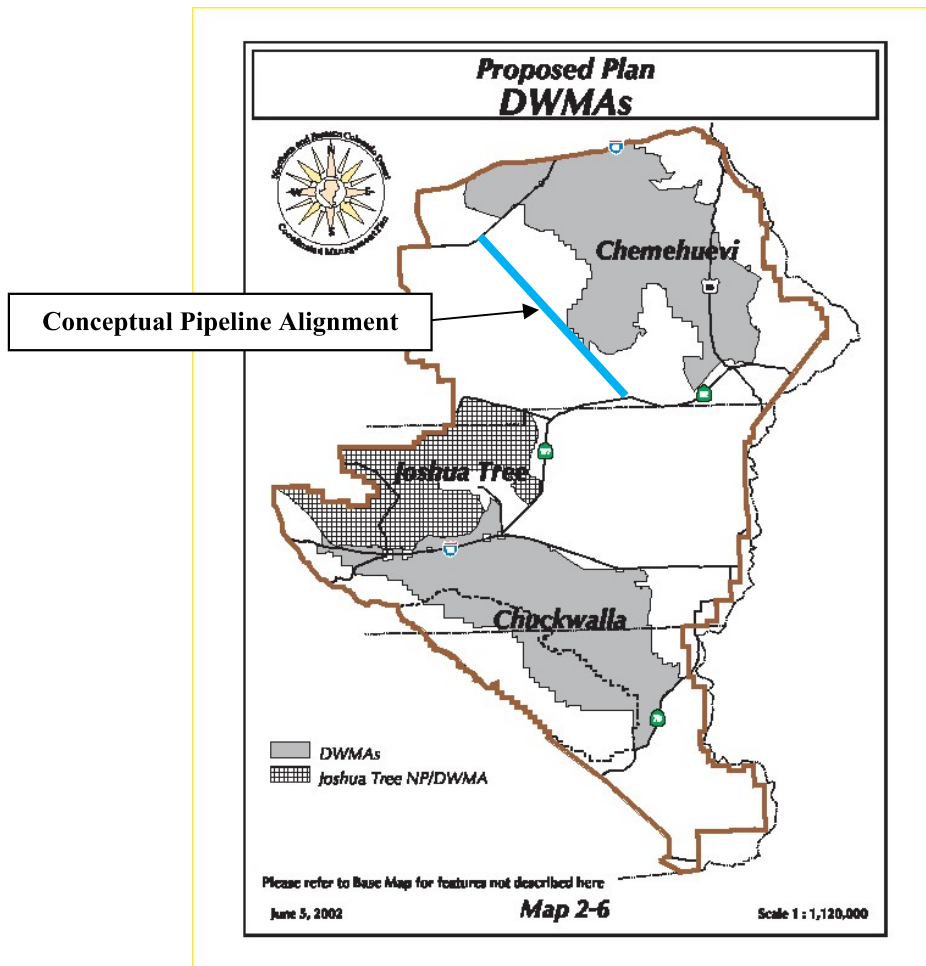
With the exception of pallid bats, which are reported in Section 3.2.2., all mammal species are relatively common to remote desert areas. Small burrowing mammals included round-tailed ground squirrel (*Spermophilus tereticaudis*), antelope ground squirrel (*Ammospermophilus leucurus*), various kangaroo rat species (*Dipodomys* spp.), Botta pocket gopher (*Thomomys bottae*), and desert wood rat (*Dipodomys deserti*). Medium-sized mammals included black-tailed hare (*Lepus californicus*) and Audubon cottontail (*Sylvilagus audubonii*). Predators included coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), and bobcat (*Lynx rufus*).

3.2. Uncommon Biological Resources.

3.2.1. *Regional Land Management for Desert Tortoise.* The County (2004) requires that habitat categories designated by the U.S. Bureau of Land Management (1989) be identified in all desert tortoise technical reports. Although habitat categories apply only to public lands administered by the BLM, regulatory agencies typically determine habitat compensation ratios based on the nearest BLM habitat categories (Desert Tortoise Compensation Team 1991). With the adoption of the Northern & Eastern Colorado Desert Coordinated Management Plan (NECO) (U.S. Bureau of Land Management 2002), all lands that are outside Desert Wildlife Management Areas (DWMA), including the Project area, are characterized as Category 3 Habitat, which is the lowest priority management area for viable populations of the desert tortoise.

The site is not found within desert tortoise critical habitat, which was designated in 1994 (U.S. Fish and Wildlife Service 1994a) nor is it within a DWMA as recommended in the Desert Tortoise (Mojave Population) Recovery Plan (U.S. Fish and Wildlife Service 1994b) and formally adopted in December 2002 as a result of NECO (U.S. Bureau of Land Management 2002). The southwestern boundary of the Chemehuevi DWMA coincides with the southwestern extent of Ward Valley, which approaches the ARZC ROW from the northeast as shown in **Figure 9** below, where the light blue line represents the proposed pipeline alignment. No portions of the Project area are in either Chemehuevi critical habitat or the associated DWMA.

Figure 9. Location of Pipeline Alignment Relative to Chemehuevi DWMA



3.2.2. *Desert Tortoise Survey Findings.* Locations of 16 items of desert tortoise sign found within and adjacent to the ARZC ROW are depicted in Figure C1 and locations of 14 sign found in the proposed wellfield areas are depicted in Figure C2 (see Appendix C for both figures). Proceeding from north-to-south along the ARZC ROW, tortoise sign found during this survey is described in **Table 1**:

Table 1. Desert Tortoise Sign Found along ARZC ROW (Figure C1)

Description	Location	Comment
1. Fresh scat of adult tortoise	±2.75 miles south of north end, east side of tracks, within ROW	Scat deposited in 2010 in “greenbelt”
2. Anterior half of plastron of adult female, dead > 4 years	±3.6 miles south of north end, east side of tracks, within ROW	See Exhibit I1 (all tortoise exhibits are in Appendix I)
3. 210 mm burrow of adult tortoise with no recent activity	±7 miles south of north end, west side of tracks, within ROW	Burrowing owl pellet at burrow but no tortoise sign
4-6. 2 fresh scat of adult tortoise and 1 fresh scat of subadult tortoise	Between 9.0 and 9.75 miles south of north, all on west side of tracks, within ROW	These scat, from at least two different tortoises were deposited in 2010
7. 12 scattered pieces of shell and leg bone of adult tortoise, dead > 4 years	±12 miles south of north, on east side of tracks, within ROW	Gender of tortoise and cause of death unknown
8. 3 small pieces of marginal bone of adult tortoise, dead > 4 years	In the vicinity of Chubbuck, on east side of tracks, within ROW	Gender of tortoise and cause of death unknown
9-11. 3 fresh scat of adult tortoise	At point where Old Woman Mountains meet ROW, west side of tracks	Large trestle in this area allows ready access to tortoises either side of tracks
12. Caliche cave with five older scat of an adult tortoise	Where Old Woman Mountains meet ROW, ±1,600 feet north	Found during subsequent zone of influence transects
13. Dirt burrow of an adult tortoise with no scat but active given excellent condition	Where Old Woman Mountains meet ROW, ±1,000 feet north	Found during subsequent zone of influence transects; see Exhibit I4
14. Portion of plastron of subadult tortoise, dead 1-4 years ago	East of Old Woman Mountains as mapped, ±1,700 feet north of Milligan	Found during subsequent zone of influence transects; see Exhibit I2
15. Single piece of carcass, age class unknown, dead > 4 years	±11 miles north of south end, on west side of tracks, within ROW	Gender of tortoise and cause of death unknown
16. Single piece of carcass, age class unknown, dead > 4 years	±4,500 feet north of south end, on west side of tracks, within ROW	Gender of tortoise and cause of death unknown

The following interpretations are provided relative to these findings:

- Importantly, an approximately equal amount of tortoise sign was found on the north and east side of the tracks (7 items) compared to the south and west side (9 items). Since the elevated berm and railroad tracks atop the berm likely serve as permeable barriers (i.e., tortoises may move under trestles but are less likely able to cross the rail line), these observations suggest that tortoises are as likely to occur on one side as the other within the ARZC ROW.
- Though spread throughout the entire ROW, most of the sign (13 of 16 items, 81%) are found from Old Woman Mountains to the north. All of the evidence of *living* tortoises was found north of Old Woman Mountains; only carcasses were found east and south of the mountains. This suggests that tortoises are more likely to be encountered along the northern 25± miles of the ARZC ROW than along the southern 19± linear miles.

- Only 1 burrow was found within the ARZC ROW, and this one, not active. Therefore, tortoises are most likely resident (i.e., residing in primary burrows) located outside the ARZC ROW with occasional forays into what would be the construction impact area.

Tortoise sign found in proposed wellfield areas is described below in **Table 2**:

Table 2. Desert Tortoise Sign within Wellfield Areas (Figure C2)

Description	Location	Comment
1-2. 2 small pieces of adult tortoise, dead > 4 years	Section 8, near south boundary	Found only 300 feet apart and of similar time since death, these may be part of the same carcass (see Exhibit I3)
3. Leg bone of adult tortoise, dead > 4 years	Section 17, on west boundary	No other parts of carcass found
4. Small piece of <i>adult</i> carapace, dead > 4 years	Section 17, near north-center	Though only 700 feet from Item 5, definitely a different tortoise
5. Small piece of <i>subadult</i> carapace, dead > 4 years	Section 17, near north-center	Though only 700 feet from Item 4, definitely a different tortoise
6-7. 2 Fresh scat an adult tortoise(s) found in open	Section 17, southeast quadrant	At almost 1,200 feet apart, these scat may have been deposited by more than one tortoise
8. Tracks of adult tortoise	Section 18, south boundary in Schulyler Wash	Found within 350 feet of recently deposited adult tortoise scat
9-10. 1 Fresh and 1 older scat of adult tortoise(s)	Section 18, south boundary in Schulyler Wash	Fresh vs. older scat suggest residency of at least one tortoise
11. Small piece of juvenile/ <i>subadult</i> carcass, dead > 4 years	Section 18, south boundary just outside Schulyler Wash	None
12-13. 2 Caliche caves within several feet of each other, 1 with 4 fresh adult scat and the 2 nd with 1 fresh adult scat	Section 18, northeast corner associated with Schulyler Wash	Given their proximity, the same tortoise likely is using these two proximate caliche caves
14. 20 scattered pieces of adult tortoise, dead >>> 4 years	Section 35, southwest corner	There is evidence given the time since death and association with tank tracks (Exhibits I5 & I6) that this tortoise likely died in the tank tracks; anomalous in that no other tortoise sign was found this far west (i.e., 3.25 miles southwest of the next nearest tortoise sign)

The following interpretations are provided relative to these findings:

- 13 out of 14 pieces of sign (93%), including all evidence of living tortoises, was found in the three easternmost sections, including Sections 8, 17, and 18. The only tortoise sign found outside these sections was that of an adult tortoise that apparently died in the 1940's as a result of military maneuvers. From these observations, it appears that tortoises are mostly or completely absent from 8 out of 11 sections, and most likely to be encountered in the three, easternmost sections.

- Schulyer Wash appears to be an important resource to tortoises, with 6 of 14 pieces of sign (43%) found in proximity to this large wash. Tortoises may use this wash as a travel corridor and/or they are relying on resources provided by the wash that apparently concentrates their use in this area.
- Although no tortoise sign was found at the conceptual spreading basin area, it is the easternmost of the Project components, contains some of the most pristine habitats (i.e., with only a few Patton-era tank tracks observed), and is surrounded by undeveloped lands of equal or greater value.

3.2.3. *Desert Tortoise Literature Findings.* In March, April, and June 1999, Ed LaRue led several different biological field crews on the initial surveys of the then-proposed Cadiz pipeline project (CMBC 1999). The 1999-proposed alignment was the same as the current alignment between Cadiz and Chubbuck, where the 1999-proposed alignment then diverged to the southwest through Kilbeck Hills and along either side of Iron Mountains. During that survey, most of the tortoise sign was found east and south of Iron Mountains (well south and west of the current alignment), with a single, older scat of an adult tortoise found several miles north of Chubbuck, within the current alignment / ARZC ROW (CMBC 1999, page 13).

Relative to the wellfield areas, in 1999 two suspect tortoise burrows were found within 300 feet south and west of the pilot spreading basins (CMBC 1999, pages 13 and 14) that were subsequently constructed in Section 13 of the proposed wellfield area. LaRue cited several reasons why these burrows were then considered to be suspect and likely not created by tortoises. Given the plethora of non-tortoise burrows found during the current study (see Burrowing Owl in Section 3.2.2.a., below), the absence of definitive tortoise sign in the vicinity of the pilot spreading basins (CMBC 1998), and the absence of definitive tortoise sign in Section 13 and elsewhere south and west during the current study, LaRue still considers that these were not tortoise burrows.

According to the proposed project map in the Draft EIR for the El Paso natural gas line (U.S. Bureau of Land Management and California State Lands Commission 2004, pages 1-3), Mile Points 220 through 260 occur in the vicinity of the Project proposed pipeline alignment. The El Paso pipeline follows Cadiz Road from near the north end of the ARZC ROW to the southwestern tip of Old Woman Mountains, where it diverges from the ARZC ROW to the southwest and rejoins it near the southern end of Danby Lake. The El Paso Draft EIR (page 4-32) states that tortoises were encountered at Mile Points 109 and 273, which are outside the reaches coincident with the Project. It further indicates that "...an inactive burrow suitable for use by desert tortoise was observed on the Cadiz Lateral" (page 4-32) but does not specifically indicate the location.

In 1991, Dr. Alice Karl and staff conducted presence-absence tortoise surveys for the Bolo Rail Cycle Project, located 6 to 8 miles west of the western boundary of the Project wellfields (Karl 1992). They performed presence-absence surveys over 4,800 acres including peripheral areas, finding only 1 juvenile carcass onsite and four potential burrows in adjacent areas (*in* USFWS 1993, page 12). Dr. Karl concluded “Desert tortoises probably do not occupy the project site but are likely present in low densities in adjacent areas...Other project surveys...[at] agricultural development about seven miles east, yielded similar results” (*in* USFWS 1993, page 12).

3.2.4. *Observable Human Disturbances.* Long, linear projects such as the proposed pipeline along the 44-mile ARZC ROW do not lend themselves to traditional disturbance analyses where observable human disturbances are tallied on a per-unit basis. But given the construction of this rail line in the early 1900’s, the continuing use of the tracks since that time, and the historical use of adjacent areas, the ARZC rail line has served as a focal point for concentrated human impacts.

There is a large amount of wood, metal, and glass debris strewn alongside the entire length of the tracks. Surveyors along the east side of the tracks tallied 484 bundles of railroad ties (visible in Exhibits G2, G4, and G7), apparently stored there for future track maintenance and repairs. The most concentrated areas of debris are at Chubbuck, a small mining community that was inhabited from the early 1920’s through 1950’s, and Milligan, where several brothers currently live, operating a salt mining operation on Danby Lake (see Exhibit G10). There are also extensive debris piles and habitat degradation at the abandoned rail line sidings at Archer and Milligan.

Most importantly, impacts and habitat loss are concentrated along the *west and south* sides of the ARZC rail line. Both creosote and saltbush communities have been severely degraded throughout and completely eliminated by a series of parallel roads along the *west and south* sides of the tracks. The loss of habitats from along the west side coupled with the flow and pooling of runoff along the east side of the tracks, juxtaposes contiguous areas that are severely impacted to the west and relatively more resourceful to the east. Though visible in most of the exhibits in Appendix G, this contrast is most striking in Exhibit I18 in Appendix I.

The consistent survey of transects spaced at 100-foot intervals throughout the proposed wellfield areas allows for direct comparisons among 9 of the 12 sections: Sections 8, 13, 17, 18, 22, 23, 24, 25, and 26. Sections 34 and 35 are only half sections, more than half of Section 27 is under fallow and active agriculture, and the northwest 160-acre parcel and 390-acre spreading basin are smaller, but all were surveyed in the same manner. Corresponding section numbers are depicted in **Figure 10**. **Table 3**, then, tabulates the prevalence of recent observable human disturbances tallied along 1/6th of the transects surveyed (i.e., observed along the transects surveyed by LaRue on the 6-member survey team).

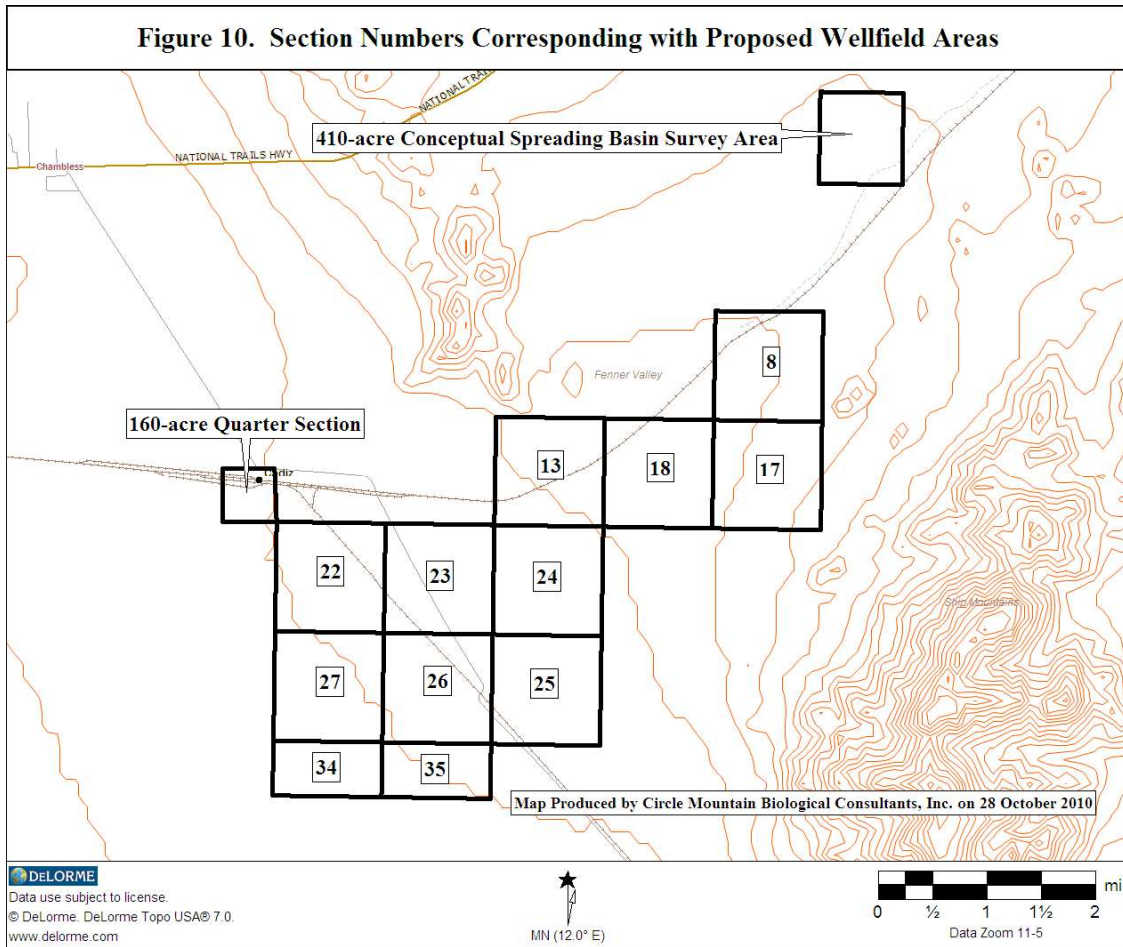


Table 3. Prevalence of Recent Human Disturbances Observed Among Wellfield Sections

Section #	Observable Human Disturbances								Totals ↓
	OHV	Roads	Rail Line	Rifle	Dump	Dog	Camp Ring	Shot Gun	
160a	19	8	3	5	10	5	-	1	51 (204)*
13	67	62	10	2	-	-	3	1	145
18	45	30	5	-	-	-	-	-	80
8	50	23	5	-	1	-	-	-	79
26	32	21	6	1	1	2	2	-	65
22	33	22	4	-	2	-	-	-	61
23	21	11	2	5	3	-	1	2	45
35	5	9	-	1	-	-	-	1	16 (32)*
25	10	13	-	1	-	2	-	1	27
34	2	6	-	2	1	2	-	-	13 (26)*
24	9	4	-	1	-	-	-	-	14
17	5	4	-	1	-	-	-	-	10
Basin	4	1	-	-	-	-	-	-	5
Totals→	302	214	35	19	18	11	6	6	

First, Section 27 is excluded from Table 3 because disturbances were not tallied in those habitats that are so severely impacted by current and past agricultural uses that all native scrub habitats have been eliminated from that section, which is the most degraded of the wellfield areas. Since the 160-acre area and Sections 34 and 35 are smaller than the other square-mile sections, the 160-acre total tallies have been multiplied by 4 and Sections 34 and 35 tallies are multiplied by 2 so that they are comparable to the other larger sections.

The following interpretations are provided relative to these findings:

- Clearly, off highway vehicle (OHV) tracks and roads/dirt trails are the most common disturbances observed, and the most ubiquitous, as they were recorded in all sections.

- It is noteworthy that disturbance prevalence, particularly OHV tracks and roads, are associated particularly with the BNSF rail line but also the ARZC line. As such, the 4 highest disturbance tallies are associated with the 160-acre parcel and Sections 13, 18, and 8, which are all bisected by the BNSF. The next highest incidences are in Sections 26, 22, and 23, which are bisected by the ARZC. To further support this conclusion, the highest prevalence of disturbances are associated with Section 13 and the BNSF and Section 26 and the ARZC, which are the two sections with the longest stretches of rail line through them. Finally, the lowest disturbance prevalence, in Sections 24, 17, and conceptual spreading basin area do not have rail lines running through them.

- The distributions of various disturbances are also noteworthy:

- Most of the domestic dog sign is in the vicinity of Section 27 and the old town site of Cadiz. Dogs were seen on several occasions with Cadiz employees in the vicinity of the orchards and vineyards.

- Older dumps were found throughout the proposed wellfield areas, but were not tallied, as we focused on recent disturbances. Yet recent dumping is still most prevalent near the abandoned Cadiz site and in sections adjacent to Section 27 with its agricultural uses.

- Rifle cartridges are distributed throughout most areas, observed in 9 of the 13 areas, and were mostly associated with target practice. Shot gun shells were observed in the vicinity of one skeet shooting area but may be mostly associated with hunting small game, including rabbits and birds in wash areas.

- Rather than being associated with remote areas, camping areas – identified by campfire rings – were in the vicinity of the rail lines and are most prevalent in Sections 13 and 26 where relatively more of the rail lines bisect those sections.

These observations reveal that current human uses of the area are centered on the two rail lines bisecting the proposed wellfields. More remote areas, particularly Sections 24, 17, and the conceptual spreading basin area are significantly less impacted by roads, OHV traffic, and other observable disturbances. Although Patton-era impacts were not tallied as recent human impacts, they are prevalent and have likely impacted habitats in very significant ways.

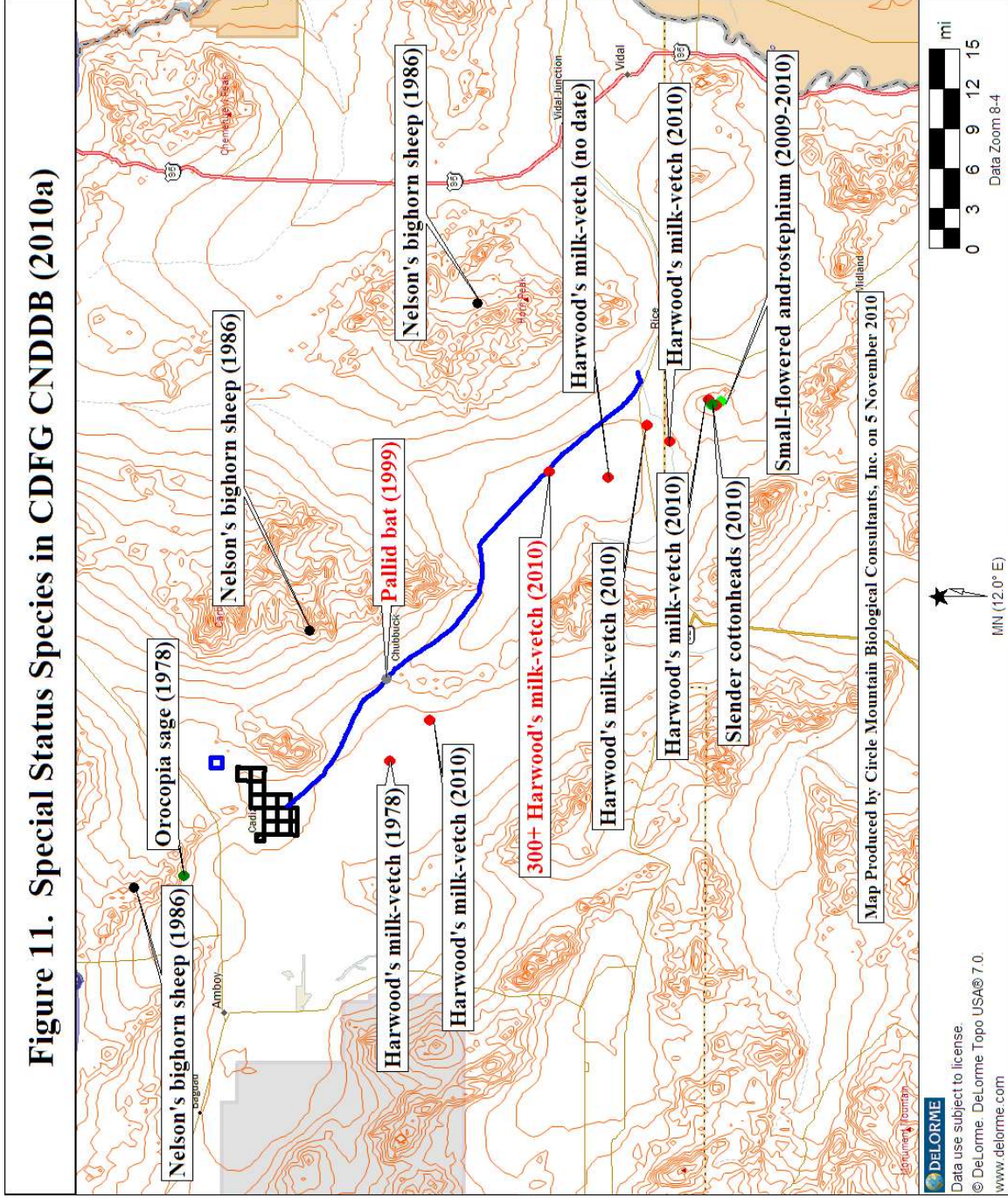
Tank tracks and other OHV tracks associated with military maneuvers in the 1940's were too prevalent to be counted, but they occur throughout the region south of the BNSF rail line. It is noteworthy that only several obvious tank tracks were observed in the conceptual spreading basin area north of BNSF compared to hundreds of tracks in a comparably-sized section south of the BNSF line. There are also earthen ramps, pits, and piles of rusty cans that are distributed across the landscape, suggesting that maneuvers involved many men over a broad regional area.

Herein, we map only those tortoise carcasses that died in recent history, typically within the past 1 to 10 years. However, we did find three or four mineralized carcass fragments that were not mapped. Dr. Brian Henen of the Twentynine Palms Marine Corps Base has suggested that these may be either water turtles or tortoises (personal communication to LaRue in 2009), and they may be from several hundred to several thousand years old. As such, they are not indicators of recent tortoise occupancy and are consequently not mapped.

We did, however, find the carcass of an adult tortoise that was intermediate in its time since death; it had not died in the past 10 years but nor was it mineralized like the fragments described above. It was rock-like in appearance and texture, but unlike the mineralized bone fragments, readily broke when minimal pressure was applied. Approximately 20 scattered pieces of this carcass were found more than three miles west of all the other tortoise sign. Upon closer inspection, we noted that the pieces lay within and adjacent to two old OHV tracks that were sufficiently wide that they were judged to be tank tracks or some other military vehicle. Depicted in Exhibits I5 and I6 in Appendix I, these are compelling evidence that military maneuvers had some, albeit unknown level of impact on tortoises during the early 1940 maneuvers.

3.2.5. *Other Special Status Species.* U.S. Fish and Wildlife Service (2002a), California Department of Fish and Game (2009, 2010b), and California Native Plant Society (CNPS 2010) maintain lists of animals and/or plants considered rare, threatened, or endangered, which are collectively referred to as "special status species." As reported in the following sections, some of these species were observed during CMBC's 2010 surveys of the ARZC ROW, wellfield areas, and conceptual spreading basin. Surveys conducted included protocol level surveys for desert tortoise, burrowing owl, and rare plants. The main literature sources for this section include CDFG's California Natural Diversity Data Base (CDFG CNDDDB 2010a), CMBC (1999), Metropolitan Water District of Southern California and U.S. Bureau of Land Management (MWD & BLM 1999), and U.S. Bureau of Land Management and California State Lands Commission (BLM CSLC 2004). Species locations reported to the CDFG CNDDDB (2010a) are shown on the next page in **Figure 11**. Current status designations, Latin names, and common names are taken from lists provided in CDFG (2009) for Special Animals and CDFG (2010b) for Special Plants.

Figure 11. Special Status Species in CDFG CNDDDB (2010a)



3.2.5.a. *Special Status Plants*. CMBC's 2010 surveys were not performed at an appropriate time of year to detect most of the special status plant species that may occur in the region. There are generally two types of special status plants, depending on the organization that designates them. Most species considered rare by CDFG and/or USFWS are identified by the California Native Plant Society (2010), which lists plants according to their rarity, distribution, and level of threat to the species. These are the typical plants considered in biological technical reports and impacts analyses. In the 1999 analysis (MWD & BLM 1999), biologists considered the presence/absence of 22 different species, many of which are not known from the region.

Table 4 lists these plants and, based on the 2010 field survey findings, judges their likelihood of occurrence within the project area. Focused surveys performed in 1995 (Tierra Madre Consultants, Inc. 1995) and 1999 (Circle Mountain Biological Consultants 1999) are referenced where appropriate. None of these plants is designated by either the CDFG or USFWS. Status designations given in the third column are assigned by CNPS (2010). Codes presented in the table are described as follows. Although there are five lists (i.e., List 1A, List 1B, List 2, List 3, and List 4) and three Threat Ranks, only those applicable to the plants reported from the region are listed below.

Environmental Science Associates (ESA) conducted protocol rare plant surveys along the pipeline route study area in April 2011. The CNDDDB (USGS 7.5 minute topographic quadrangles: Cadiz Lake NW, Cadiz Lake NE, Chubbuck, Milligan, Danby Lake, and Africa Mountains) and CNPS online databases were queried to develop a list of special status and rare plant species that have been previously recorded in the Project region, along with this report. Field surveys were focused on 21 plant species identified through the database search results and other research, which were determined to have a medium potential to occur within the pipeline route study area based on the proximity of the project to previously recorded occurrences in the region, on-site vegetation and habitat quality, topography, elevation, soils, surrounding land uses, habitat preferences, and geographic ranges of special status plant species known to occur in the region.

List 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere

The plants of List 1B are rare throughout their range with the majority of them endemic to California. Most of the plants of List 1B have declined significantly over the last century. List 1B plants constitute the majority of the plants in CNPS' Inventory with more than 1,000 plants assigned to this category of rarity. All of the plants constituting List 1B meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. *It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA* [Emphasis added].

List 2: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Except for being common beyond the boundaries of California, the plants of List 2 would have appeared on List 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Endangered Species Act. Until 1979, a similar policy was followed in California. However, after the passage of the Native Plant Protection Act, plants were considered for protection without regard to their distribution outside the state.

With List 2, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary process and genetic diversity within species. All of the plants constituting List 2 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.

List 3: Plants About Which We Need More Information - A Review List

The plants that comprise List 3 are united by one common theme - they lack the necessary information to assign them to one of the other lists or to reject them. Nearly all of the plants remaining on List 3 are taxonomically problematic. For each List 3 plant we have provided the known information. Data regarding distribution, endangerment, ecology, and taxonomic validity will be gratefully received by e-mailing the Rare Plant Botanist at njensen@cnps.org or (916) 324-3816.

Some of the plants constituting List 3 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing. We strongly recommend that List 3 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.

List 4: Plants of Limited Distribution - A Watch List

The plants in this category are of limited distribution or infrequent throughout a broader area in California, and their vulnerability or susceptibility to threat appears relatively low at this time. While we cannot call these plants "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a List 4 plant change, we will transfer it to a more appropriate list.

Very few of the plants constituting List 4 meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and we strongly recommend that List 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA. This may be particularly appropriate for the type locality of a List 4 plant, for populations at the periphery of a species' range or in areas where the taxon is especially uncommon or has sustained heavy losses, or for populations exhibiting unusual morphology or occurring on unusual substrates.

Threat Ranks

The CNPS Threat Rank is an extension added onto the CNPS List and designates the level of endangerment by a 1 to 3 ranking, with 1 being the most endangered and 3 being

the least endangered. A Threat Rank is present for all List 1B's, List 2's and the majority of List 3's and List 4's. List 4's may contain a Threat Rank of 0.2 or 0.3; however an instance in which a Threat Rank of 0.1 is assigned to a List 4 plant has not yet been encountered. List 4 plants generally have large enough populations to not have significant threats to their continued existence in California; however, certain conditions still exist to make the plant a species of concern and hence be placed on a CNPS List. In addition, all List 1A (presumed extinct in California), and some List 3 (need more information) and List 4 (limited distribution) plants, which lack threat information, do not have a Threat Rank extension.

- 0.1-Seriously threatened in California (high degree/immediacy of threat)
- 0.2-Fairly threatened in California (moderate degree/immediacy of threat)
- 0.3-Not very threatened in California (low degree/immediacy of threats or no current threats known)

Plant ranks found in Table 4 include the following:

List 1B.1 plant, indicating that it is Rare, Threatened, or Endangered in California and Elsewhere, and seriously threatened in California (high degree/immediacy of threat).

List 1B.2 plant, indicating that it is Rare, Threatened, or Endangered in California and Elsewhere, and fairly threatened in California (moderate degree/immediacy of threat).

List 1B.3 plant, indicating that it is Rare, Threatened, or Endangered in California and Elsewhere, and not very threatened in California (low degree/immediacy of threats or no current threats known).

List 2.2 plant, indicating that it is Rare, Threatened, or Endangered in California, But More Common Elsewhere, and fairly threatened in California (moderate degree/immediacy of threat).

List 2.3 plant, indicating that it is Rare, Threatened, or Endangered in California, But More Common Elsewhere, and not very threatened in California (low degree/immediacy of threats or no current threats known).

List 4.2. plant, indicating that it is of Limited Distribution - A Watch List, and fairly threatened in California (moderate degree/immediacy of threat).

List 4.3 plant, indicating that it is of Limited Distribution - A Watch List, and not very threatened in California (low degree/immediacy of threats or no current threats known).

Table 4. Plant Species Reported from the Area

Common Name	Scientific Name	Status Designation	Likelihood of Occurrence
Small-flowered androstephium	<i>Androstephium breviflorum</i>	List 2.2	Creosote bush scrub and desert dunes between 840 and 4,960 feet; found west of Iron Mountains in 1995 (also Figure 11); suitable habitat throughout Project area
White bear poppy	<i>Arctomecon merriamii</i>	List 2.2	Rocky soils in creosote bush scrub between 1,520 and 4,910 feet; not found in 1995 or 1999; site is outside range and elevations are too low
Harwood's milk-vetch	<i>Astragalus insularis</i> var. <i>harwoodii</i>	List 2.2	Sandy or gravelly desert dunes, desert scrub below 930 feet; 300+ plants between Danby Lake and Cadiz Road in 2010 (Figure 11); suitable habitats and elevations along ARZC ROW and western wellfields
Borrego milk-vetch	<i>Astragalus lentiginosus</i> var. <i>borreganus</i>	List 4.3	Sandy soils in creosote bush scrub between 90 and 840 feet; observed in 1995 east of Iron Mountain pumping plant and Cadiz Lake in sand field areas; suitable habitats and elevations in western wellfields and sandy areas along ARZC ROW particularly near Danby Lake
Crucifixion thorn	<i>Castela emoryi</i>	List 2.3	Deciduous shrub along gravelly washes, slopes, and plains in creosote bush scrub between 280 and 1,890 feet; not found in 1995 or 1999; as a large shrub occurring in washes, this plant would have been found if present within the ARZC ROW
Las animas colubrina	<i>Colubrina californica</i>	List 2.3	Evergreen shrub in creosote bush scrub between 30 and 3,100 feet; not found in 1995 or 1999; as a large shrub occurring in washes, this plant (found by LaRue near Desert Center) would have been found if present within the ARZC ROW
Alverson's foxtail cactus	<i>Coryphantha alversonii</i>	List 4.3	Rocky to cobbly soils in creosote bush scrub between 230 and 4,730 feet; found west of Iron Mountain in 1995; suitable habitats in Section 17 and where Ship and Old Woman Mountains approach ARZC ROW
Ribbed cryptantha	<i>Cryptantha costata</i>	List 4.3	Sandy soils in creosote bush scrub between 180 and 1,550 feet; found in 1995 at Cadiz Lake and in areas of stabilized dunes, but not along Cadiz Road; suitable habitats east of Danby Lake
Winged cryptantha	<i>Cryptantha holoptera</i>	List 4.3	Sandy to rocky soils in creosote bush scrub between 310 and 3,720 feet; not found in 1995 or 1999; suitable habitats throughout
Utah vine milkweed	<i>Cynanchum utahense</i>	List 4.2	Dry sandy, gravelly soil in creosote bush scrub between 465 and 4,400 feet; not found in 1995 or 1999; suitable habitats throughout

Common Name	Scientific Name	Status Designation	Likelihood of Occurrence
Howe's hedgehog cactus	<i>Echinocereus engelmannii</i> var. <i>howei</i>	List 1B.1	In creosote bush scrub between 1,333 and 2,400 feet; not found in 1995 or 1999; elevations too low to be suitable
Little San Bernardino Mountains linanthus	<i>Linanthus maculatus</i>	List 1B.2	Sandy soils in creosote bush scrub between 604 to 6,030; not observed in 1995 or 1999; found in the vicinity of Joshua Tree, the Project area is well outside the known range of the species
Spear-leaf matelea	<i>Matelea parvifolia</i>	List 2.3	Dry rocky soils in creosote bush scrub between 1,360 and 3,390 feet; not found in 1995 or 1999; elevations too low to be suitable
Robison's monardella	<i>Monardella robisonii</i>	List 1B.3	Pinyon-juniper woodland between 1,890 and 4,650; not found in 1995 or 1999; site is outside range and elevations are too low
Slender cottonheads	<i>Nemacaulis denudate</i> var. <i>gracilis</i>	List 2.2	Sandy slopes above drainage at 1,560 feet; found in Arica Mountains in 2010 (Figure 11); suitable habitats and elevations along ARZC ROW and western wellfields
Short-joint beavertail cactus	<i>Opuntia basilaris</i> var. <i>brachyclada</i>	List 1B.2	Creosote bush scrub between 1,320 and 5,580 feet; not found in 1995 or 1999; site is outside range and elevations are too low
White-margined beardtongue	<i>Penstemon albomarginatus</i>	List 1B.1	Sandy soils, stabilized dunes, roadside washes in creosote bush scrub between 1,980 and 3,300 feet; elevations too low to be suitable
Stephen's beardtongue	<i>Penstemon stephensii</i>	List 1B.3	Carbonate or rocky soils in creosote bush scrub between 3,500 and 5,720 feet; not found in 1995 or 1999; elevations too low to be suitable
Lobed ground-cherry	<i>Physalis lobata</i>	List 2.3	Decomposed granite in creosote bush scrub between 1,550 and 2,480 feet; not found in 1995 or 1999; elevations too low to be suitable
Orocopia sage	<i>Salvia greatae</i>	List 1B.3	Broad alluvial bajadas and fans beside washes in creosote bush scrub between 120 and 2,500 feet; found in Marble Mountains in 1978 (see Figure 11); potentially suitable habitats in Section 17 and where Ship and Old Woman Mountains approach ARZC ROW
Rusby's desert-mallow	<i>Sphaeralcea rusbyi</i> var. <i>eremicola</i>	List 1B.2	Creosote bush scrub between 3,020 and 4,650; not observed in 1995 or 1999; elevations too low to be suitable

The second broad category of protected plants relates to county and state ordinances. At the county level, the San Bernardino County Development Code was revised and adopted on 12 April 2007. Chapter 88.01 Plant Protection and Management, Section 88.01.020 states, "The provisions of this Chapter apply to the removal and relocation of regulated trees or plants and to any encroachment (for example, grading) within the protected zone of a regulated tree or plant on all private land within the unincorporated areas of the County and on public lands owned by the County, unless otherwise specified..."

Section 88.01.060 Desert Native Plant Protection states, “This Section provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources...”

Section 88.01.060(c) Regulated Desert Native Plants states, “The following desert native plants or any part of them, except the fruit, shall not be removed except under a Tree or Plant Removal Permit in compliance within Section 88.01.050 (Tree or Plant Removal Permits):

- (1) The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:
 - (A) *Dalea spinosa* (smoke tree).
 - (B) All species of the genus *Prosopis* (mesquites).
- (2) All species of the family *Agavaceae* (century plants, nolin, yuccas).
- (3) Creosote Rings, 10 feet or greater in diameter.
- (4) All Joshua trees.
- (5) Any part of the following species, whether living or dead:
 - (A) *Olneya tesota* (desert ironwood).
 - (B) All species of the genus *Prosopis* (mesquites).
 - (C) All species of the genus *Cercidium* (palo verdes).”

At the state level, the 1998 Food and Agricultural Code, Division 23: California Desert Native Plants, Chapter 3: Regulated Native Plants, Section 80073 states: The following native plants, or any parts thereof, may not be harvested except under a permit issued by the commissioner or the sheriff of the county in which the native plants are growing:

- (a) All species of the family *Agavaceae* (century plants, nolin, yuccas).
- (b) All species of the family *Cactaceae* (cacti), except for the plants listed in subdivisions (b) and (c) of Section 80072 (i.e., saguaro and barrel cacti), which may be harvested under a permit obtained pursuant to that section.
- (c) All species of the family *Fouquieriaceae* (ocotillo, candlewood).
- (d) All species of the genus *Prosopis* (mesquites).
- (e) All species of the genus *Cercidium* (palo verdes).
- (f) *Acacia greggii* (catclaw acacia).
- (g) *Atriplex hymenelytra* (desert holly).
- (h) *Dalea (Psoralea) spinosa* (smoke tree).
- (i) *Olneya tesota* (desert ironwood), including both dead and live desert ironwood.

Barrel cactus, silver cholla, beavertail cactus, pencil cholla, desert holly, catclaw acacia, palo verde, and smoke tree are the plant species included in one or both of the above lists that were observed on the subject property.

3.2.5.b. *Burrowing Owl*. Sometimes referred to as “western burrowing owl,” burrowing owl (*Athene cunicularia*) is a California Species of Special Concern and, except for its designation as “BLM Sensitive,” has no federal designation. Along with desert tortoise, burrowing owl was one of the two target species sought by focused surveys conducted by CMBC in September and October 2010.

As depicted in **Figure D1** for the pipeline alignment and **Figure D11** for the proposed wellfield areas, CMBC found the following evidence of burrowing owl in these two Project areas:

Cadiz Pipeline Alignment / ARZC ROW

- 3 Rodent colonies with sign
- 1 Rodent colony where a single owl was flushed
- 4 Unknown burrows with sign
- 1 bundle of railroad ties used as a perch site with sign

Cadiz Wellfield Areas

Section 8	0 owls and 0 active burrows
Section 13	1 owl and 2 active burrows
Section 17	1 owl and 2 active burrows
Section 18	0 owls and 8 active burrows
Section 22	2 owls and 2 active burrows
Section 23	2 owls and 3 active burrows
Section 24	1 owl and 2 active burrows
Section 25	0 owls and 1 active burrow
Section 26	0 owls and 0 active burrows
Section 27	0 owls and 0 active burrows
Half-Section 34	0 owls and 3 active burrows
Half-Section 35	0 owls and 0 active burrows
160-acre Parcel	0 owls and 0 active burrows
Spreading Basin	0 owls and 1 active burrows

As mentioned in Section 2.3, for burrowing owl, there are four types of burrows available for use by owls, which may modify existing burrows but rarely create their own: larger rodent colonies, inactive kit fox dens, badger digs, and single-entrance burrows created by an unknown source (ambiguous burrows likely created by badger or kit fox). Caliche caves are one additional location where burrowing owl sign was found. Since this is a formal Phase 1 and Phase II habitat assessment, it is prudent to report the results of (1) burrow types occupied by owls and (2) burrow types available to owls (excluding available caliche caves, which were not counted), which will then allow us to determine the relative values of a given area for this species.

Table 5 reports the burrow types occupied by burrowing owls in the pipeline alignment / ARZC ROW and wellfield areas. Within each column, the numbers of owls observed are shown in red font and the numbers of occupied burrows are shown in blue font.

Table 5. Burrow Types Occupied by Burrowing Owl

Project Area	Types of Burrows Occupied				
	Colonies	Unknown	Kit Fox	Badger	Other
Pipeline	1 + 3	4	-	-	1 Tie bundle
Wellfield	1 + 1	2 + 10	1 + 5	1 + 1	3 Caliche 2 No Burrows
Totals	2 + 4	2 + 14	1 + 5	1 + 1	2 + 4

The following observations are provided relative to these findings:

- Burrowing owls have been observed at all four burrow types; 2 were flushed from areas where no burrows were found (i.e., “2 No Burrows”). Four of the 6 owls observed at burrows occurred at colonies and unknown burrows, with the other 2 owls flushed from an inactive kit fox den and badger dig.
- Of the 24 burrows observed where owl sign was found, 14 (58%) occurred at unknown burrows, 5 (21%) occurred at inactive kit fox dens, 4 (17%) occurred at colonies, and 1 (4%) occurred at a badger dig.

These results indicate that although burrowing owls may be found at all burrow types, their sign is most often detected at unknown burrows and kit fox dens, which included 79% of the occupied burrow types. Another important consideration, then, is the availability of each of each burrow types. Which burrow types are most and least common in the Project area? Whereas the wellfield sections are obvious ways to segregate the data for those areas, the pipeline alignment / ARZC ROW is less obvious. For purposes of reporting the results in **Table 6** and providing the comparisons given in Table 5, the pipeline alignment / ARZC ROW is segregated into 9 reaches including Areas 1 through 8 that are each about 5 linear miles and Area 9, which is the residual area of about 4 linear miles (see Figure D1 in Appendix D). Data for each Area is presented in descending order, with the most burrows in the top row and least at bottom.

Table 6. All Burrow Types Available along the Pipeline Alignment / ARZC ROW

Project Area	Types of Available Burrows				
	Colonies	Unknown	Kit Fox	Badger	Totals
Area 7	85	36	25	12	158
Area 6	104	31	8	8	151
Area 2	119	21	2	4	146
Area 8	91	14	8	6	119
Area 3	60	37	2	12	111
Area 4	48	11	4	4	67
Area 9	41	12	9	3	65
Area 1	21	7	0	1	29
Area 5	7	11	3	3	24
Totals	576 (66%)	180 (21%)	61 (7%)	53 (6%)	870

The following interpretations are provided relative to these findings:

- The prevalence of burrows in descending order is 576 colonies, 180 unknown burrows, 61 kit fox dens, and 53 badger digs.
- By comparing these data with the data summarized in Table 5, although the 576 colonies comprise the most available burrow type (66%), owl sign was found at relatively fewer colonies (17%) than other burrow types, excepting badger digs, comprising 4%.
- Interestingly, most burrows were found in Areas 2 and 3 between Ship and Old Woman Mountains and in Areas 6, 7, and 8, which are southeast of Old Woman Mountains. The fewest burrows were found in Area 1 west of Ship Mountains and Area 5 west of Old Woman Mountains. The prevalence of burrows in Areas 2, 3, 6, 7, 8, and 9 is due to the open sandy substrates comprising those reaches compared to the rocky, cobble-strewn substrates in Areas 1, 4, and 5 where the fewest numbers of burrows were found.
- In fact, of the 9 places where owls were detected, 4 signs were in Area 2, 1 sign was in Area 3, and 3 signs were in Area 6. So, 8 of 9 signs (89%) of the detected burrowing owl signs were found at burrows in Areas 2, 3, and 6.
- These data will be very useful in designing focused breeding bird surveys by identifying those areas where burrowing owls are most likely to occur.

Similar to Table 5, in **Table 7** all available burrow types are shown, with wellfield sections presented in descending order from most to fewest total burrows.

Table 7. All Burrow Types Available within Wellfield Areas

Types of Available Burrows					
Project Area	Colonies	Unknown	Kit Fox	Badger	Totals
Section 13	184	12	13	6	215
Section 24	104	56	17	5	182
Section 18	118	30	9	20	177
Basin	118	35	12	3	168
Section 23	122	31	9	2	164
Section 25	118	24	12	3	157
Section 26	137	12	2	0	151
Section 22	113	7	2	2	124
Section 8	86	14	5	5	110
Section 17	44	13	1	9	67
Section 35	54	3	4	0	61
Section 34	31	8	2	3	44
160 acres	12	2	0	1	15
Section 27	10	3	0	0	13
Totals	1251 (76%)	250 (15%)	88 (5%)	59 (4%)	1648

The following interpretations are provided relative to these findings:

- The prevalence of available burrow types is in the same descending order of prevalence observed along the pipeline ROW, namely colonies, then unknown burrows, then inactive kit fox dens, and finally badger digs.
- There are relatively more colonies within the wellfield areas (76%) than along the pipeline alignment / ARZC ROW (66%) and relatively more unknown burrows along the pipeline alignment / ARZC ROW (21%) than in the wellfield areas (15%).
- Though one of the least disturbed, pristine sections within the wellfield areas, Section 17 has a depressed number of burrows because, like the ARZC ROW in the vicinities of Ship and Old Woman mountains, substrates are relatively more rocky in Section 17 than in any other section.
- In descending order of prevalence, owls sign was found in the following sections: Section 18 (8 occupied burrows), Section 23 (2 owls, 3 burrows), Section 22 (2 owls, 2 burrows), Sections 13, 17, and 24 (each with 1 owl, 2 burrows), half-Section 34 (3 burrows), and Section 25 and the spreading basin (each with 1 burrow). There seems to be no clear relationship between the numbers of available burrows and the prevalence of owl sign.
- Although there are suitable burrows for burrowing owls throughout the wellfield areas (excepting Section 27 with its prevalence of agricultural impacts), the sections identified in the preceding bullet will help direct the locations of focused burrowing owls breeding surveys.

In general, these data and observations suggest that burrowing owls may occupy any of the four available burrows, and caliche caves. They are more likely to occur in sandy areas than in rocky areas, the latter of which support fewer burrows for burrowing owls to occupy.

3.2.5.c. *Cooper's Hawk*. Cooper's hawk (*Accipiter cooperii*) is included on CDFG's Watch List and has no federal status. Although none was observed along the ARZC ROW, 6 were observed during the wellfield surveys (see Figure E2), including several that were flushing small passerine birds from orchards. There are both resident and migratory populations in southern California, and those observed at this time of year were likely to be migrants. Cooper's hawk is more likely to forage than nest in the Project area.

3.2.5.d. *Prairie Falcon*. Prairie falcon (*Falco mexicanus*) is included on CDFG's Watch List and is designated by CDFG as a USFWS Bird of Conservation Concern. Figures E1 and E2 show locations of 5 prairie falcons observed along the ARZC ROW and 6 observed during surveys of the wellfields. Prairie falcons were observed chasing mourning doves near the lime orchard in Section 27 and likely depredate birds throughout the Project area, where there is suitable foraging habitat. They likely nest in the Ship and Old Woman Mountains, but would not nest in the immediate Project area.

3.2.5.e. *Vaux's Swift*. Vaux's swift (*Chaetura vauxi*) is a California Species of Special Concern and not federally designated. A single bird was observed passing over the southern portion of the ARZC ROW in late September. A seasonal migrant through the area, Vaux's swifts may be observed in the spring and fall but would not nest and forage minimally in the Project area.

3.2.5.f. *LeConte's Thrasher*. LeConte's thrasher (*Toxostoma lecontei*) is designated by CDFG as a California Species of Special Concern and identified by CDFG as a USFWS Bird of Conservation Concern. Individual LeConte's thrashers were observed in two places, including 1 along the east side of Danby Lake (Figure E1) and 1 at the conceptual spreading basins (Figure E2). The species is very secretive and likely more common than observed. Two were reported in Schulyler Wash and 1 at an undisclosed place in the conceptual spreading basins during previous surveys (MWD and BLM 1999, page 41). All sandy-bottom, well-developed washes with streamside growth are considered ideal habitats for this species, which will both nest and forage in such habitats.

3.2.5.g. *Loggerhead Shrike*. Loggerhead shrike (*Lanius ludovicianus*) is designated as a California Species of Special Concern and has no federal status. They appear to be the most common special status bird species in the region. Shrikes were identified by sight and sign during CMBC's surveys. **Figures E1 and E2** in Appendix E show the locations of 6 shrikes observed along the ARZC ROW and 14 that were observed within the wellfield areas, respectively. However, since shrikes regurgitate distinctive pellets that can be readily identified in the field, Figure E1 shows 93 additional locations, including 58 under train trestles and 35 at bundled railroad ties, where loggerhead shrikes have recently occurred. Loggerhead shrike apparently occurs throughout the Project area, would nest in larger trees particularly alongside washes, and is one of several species that may actively seek out railroad trestles for various resources, including perch sites and foraging.

The six bird species listed above were the only ones detected during the 2010 surveys. **Table 8** below lists the other bird species reported from the region (MWD & BLM 1999) that were not observed in 2010 and their status designations. In the third column, the first status designation is for CDFG followed by its federal designation, if any (CDFG 2009).

Table 8. Special Status Bird Species Previously Reported But Not Observed in 2010

Common Name	Scientific Name	Status Designation	Reported Occurrence
Northern harrier	<i>Circus cyaneus</i>	Species of Special Concern None	1 observed in 1999 near Iron Mountain
Sharp-shinned hawk	<i>Accipiter striatus</i>	Watch List None	2 observed in 1999 in agricultural areas
Swainson's hawk	<i>Buteo swainsoni</i>	Threatened Bird of Conservation Concern	Not reported but likely to occur as incidental migrant
Ferruginous hawk	<i>Buteo regalis</i>	Watch List Bird of Conservation Concern	2 observed in 1999 in agricultural areas

Common Name	Scientific Name	Status Designation	Reported Occurrence
Golden eagle	<i>Aquila chrysaetos</i>	Watch List Bird of Conservation Concern	1 observed west of Iron Mountain in 1999
Merlin	<i>Falco columbarius</i>	Watch List None	Not reported but likely to occur as incidental migrant
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	Species of Special Concern Bird of Conservation Concern	Not reported but may occur in suitable habitats on Danby Lake
Mountain plover	<i>Charadrius montanus</i>	Species of Special Concern Bird of Conservation Concern	Not reported with potentially suitable habitats in fallow agricultural areas
Long-eared owl	<i>Asio otus</i>	Species of Special Concern None	1 observed in 1999 west of Iron Mountain in smoke tree wash

The 5 hawk species, 1 falcon species, and 1 owl species are all likely to occasionally forage over both natural desert scrub areas and some, like ferruginous hawk and merlin, to forage in agricultural areas. None of these species would nest in the Project area. No ideally suitable habitats exist within the Project area for either of the plover species.

3.2.5.h. *Special Status Mammals*. The two special status mammals detected during CMBC's 2010 surveys included pallid bat and American badger. Observations for these two species are given below, followed by Table 9, which lists other special status mammals reported from the region.

3.2.5.h.i. *Pallid Bat*. Pallid bat (*Antrozous pallidus*) is designated as a California Species of Special Concern and is not designated by the USFWS. The following information is taken from MWD & BLM (1999). Pallid bats are distributed from south-central British Columbia to central Mexico and frequent arid regions with rocky outcroppings, particularly near water. The gregarious species usually roosts in small colonies of 20 or more individuals in rock crevices and buildings, but occasionally roosts in caves, mines, and tree cavities. It feeds chiefly on large prey that is taken on the ground or perhaps less frequently in flight within a few meters of the ground or from surfaces of vegetation.

Previously, on 25 May 1999, a pair of pallid bats was observed at an active night roost at a train trestle east of Kilbeck Hills (CDFG CNDDDB 2010b). Based on the 2010 survey, we now know that they are much more common in the Project area along the ARZC ROW than previously noted. Surveyors closely inspected approximately 70 train trestles for the presence or evidence of pallid bats. As shown in Figure F1 in Appendix F, surveyors observed 163 bats (Exhibits I13, I14, and I15) at 13 different trestles (Exhibits I16 and I17) located along the entire length of the rail line. Also indicated in Figure F1, there were 9 other trestles where bat guano was observed but not bats, and 45 trestles where neither bats nor guano were observed.

There are at least four different types of trestles, including cement (Exhibit I16 and I17), wood (Exhibit I20), a combination of the two, and corrugated culverts (Exhibit I22) along the ARZC ROW. Pallid bats were mostly observed at the cement and wood trestles, less so at the combined type, and never in the corrugated culverts. Surveyors also checked a half-dozen similar trestles along the BNSF line in the wellfield areas but did not find any bats or guano. It may be that the heavy train traffic on the BNSF line compared to only 2 or 3 trips per day on the ARZC line precludes bats from the BNSF but not the ARZC ROW.

3.2.5.h.ii. *American Badger*. American badger (*Taxidea taxus*) is considered a Species of Special Concern by CDFG and has no federal designation. Found throughout California except the extreme northwest, badgers mostly prey on ground squirrels. As part of the burrowing owl habitat assessment, surveyors collected UTM coordinates for 53 badger digs along the ARZC ROW and 59 digs in the surveyed wellfield areas. They appear to be widespread throughout all Project areas.

3.2.5.g.iii. *Other Special Status Mammals*. Pallid bats and American badger were the only two rare mammals observed or detected. The previous analysis (MWD & BLM 1999) considered 10 additional bat species, southern grasshopper mouse, Yuma mountain lion, and Nelson’s bighorn sheep which are included in **Table 9** on the next page. Each of these species is a California Species of Special Concern. Though not designated by either CDFG or USFWS, Nelson’s bighorn sheep is included because it is considered sensitive by the BLM.

Table 9. Special Status Mammal Species Previously Reported But Not Observed in 2010

Common Name	Scientific Name	Status Designation	Reported Occurrence
California leaf-nosed bat	<i>Macrotus californicus</i>	Species of Special Concern None	Roosts in abandoned mine tunnels, open buildings, cellars, porches, rock shelters, and mines; not found in 1995 or 1999; Project area within range
Arizona myotis	<i>Myotis occultus</i>	Species of Special Concern None	May occur in desert areas near open water sources, roosting in mines and natural cavities; not found in 1995 or 1999; Project area within range
Cave myotis	<i>Myotis velifer</i>	Species of Special Concern None	Occurs in large colonies in caves but also mine shafts and buildings; not found in 1995 or 1999; Project area within range
Spotted bat	<i>Euderma maculatum</i>	Species of Special Concern None	Day roosts on open cliff faces in rock crevices; not found in 1995 or 1999; Project area within range

Common Name	Scientific Name	Status Designation	Reported Occurrence
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Species of Special Concern None	Hibernate in caves and mines, feeding entirely on moths; not found in 1995 or 1999; Project area within range
Pocketed free-tailed bat	<i>Nyctinomops femorosaccus</i>	Species of Special Concern None	Roosts in crevices in rugged cliffs, slopes, and tall rocky outcrops; not found in 1995 or 1999; Project area within range
Big free-tailed bat	<i>Nyctinomops macrotis</i>	Species of Special Concern None	Inhabits rocky areas, roosting on cliff faces but also buildings; not found in 1995 or 1999; Project area within range
Western mastiff bat	<i>Eumops perotis californicus</i>	Species of Special Concern None	Most common in rugged, rocky canyons and cliffs; observed foraging at Iron and Ship mountains and Kilbeck Hills in 1999 (MWD & BLM 1999, page 43-44)
Fringed myotis	<i>Myotis thysanodes</i>	Species of Special Concern None	Roosts in caves, mines, and buildings; maternity colony reported 15 miles north of wellfields, may occur in Ship Mountains (MWD & BLM 1999, page 44)
Southern grasshopper mouse	<i>Onychomys torridus ramona</i>	Species of Special Concern None	Located in sandy areas in Sonoran and Mojave deserts; suitable habitat occurs in all Project areas
Yuma mountain lion	<i>Puma concolor browni</i>	Species of Special Concern None	Prefers rocky and hilly terrain; not previously observed; suitable habitats in Ship, Iron, and Old Woman mountains, and Kilbeck Hills
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	None BLM Sensitive	Prefers rocky and hilly terrain but may cross wide open areas between mountain ranges; reported from Marble, Old Woman, and Turtle mountains (see Figure 11).

CMBC is fairly certain that only pallid bats were observed at train trestles as described in Section 3.2.2.g.i., above. The Project area is within the known range of the other bat species. It would require focused echolocation studies to determine the occurrence of these and other bat species in the area. Similarly, it would require focused trapping studies to determine the presence and distribution of southern grasshopper mouse in the Project area. Though residents of regional mountainous areas, there is some potential for Yuma mountain lion and Nelson's bighorn sheep to occasionally enter the Project area en route to more suitable, mountainous habitats.

3.3. Other Protected Biological Resources. Stream courses provide relatively important resources to animals and plants. In dry years, and particularly during prolonged drought, annual plants may only germinate in the vicinity of washes where the water table is relatively near the surface. Perennial shrubs adjacent to washes are often the only plants that produce flowers and fruit, which in turn are important to insects and the avian predators that feed on them. Shrubs also tend to be somewhat taller and denser alongside washes, which provides cover for medium and larger sized animals that may use them as travel corridors. Biodiversity is generally enhanced by washes, and there are often both annual and perennial plants that are either restricted to or mostly associated with wash margins. There are both anecdotal accounts and published literature on washes being important to tortoises, which use them as travel corridors and access to nearby annual forage.

CMBC has prepared a separate report and jurisdictional delineation for the +/- 70 washes crossing the ARZC ROW and others, particularly Schulyler Wash, in the wellfield areas.

4.0. Conclusions and Recommendations

4.1. Impacts to the Desert Tortoise and Proposed Mitigation.

4.1.1. *Findings.* Though only one older scat of an adult tortoise had been found during previous surveys of the ARZC ROW between Cadiz and Chubbuck (Circle Mountain Biological Consultants 1999), during September 2010 as depicted in Figure C1, CMBC found 4 scat [3 from adult(s) and 1 from a subadult tortoise], 3 carcasses, and 1 burrow along the same ROW stretch. All evidence of living tortoises was found between the north end of the ARZC ROW and Old Woman Mountains, with three carcasses found to the south. Tortoises may be absent or occur in very low densities south of Old Woman Mountains and are not common anywhere along the ARZC ROW, apparently occurring in low densities along northern reaches.

In the wellfield areas (see Figure C2), evidence of living tortoises was restricted to Sections 17 and 18, with carcasses found in Sections 8 and 35. The carcass found in Section 35 appears to have died in the early 1940's and was the only tortoise sign found in central and western portions of the wellfield areas. Based on these results, CMBC concludes that tortoises are most likely to be encountered in the eastern wellfield areas (particularly Section 17 and 18, and perhaps Section 8) and least likely to be encountered elsewhere. Though not detected at the spreading basin area, habitats there are among the least impacted, most suitable, and tortoise(s) may occur there in the future, if not already (i.e., we cannot say that they are absent because a 100% coverage, along 30-foot transects, was not surveyed).

Protocol-level surveys were performed throughout the pipeline ROW but not in the wellfield or spreading basin areas. There may be tortoises present in these areas that would have been found along transects spaced at 30-foot intervals but were not detected along the transects we surveyed at 100-foot intervals. The results do likely show the regional pattern of occurrence for tortoises, with relatively higher densities to the east and lower densities or no tortoises in central and western portions of the wellfield areas. This level of effort is judged to be sufficient for purposes of preparing the Draft EIR analysis and would not change any of the recommended mitigation measures discussed below. Cadiz has indicated its willingness to perform more detailed surveys further along in the wellfield and spreading basin design process and/or at the request of pertinent regulatory agencies.

Regardless of survey results and conclusions given herein, tortoises are protected by applicable State and federal laws, including the California Endangered Species Act and Federal Endangered Species Act, respectively. As such, if a tortoise is found on-site at the time of construction, all activities likely to affect that animal(s) should cease and the County contacted to determine appropriate steps.

Importantly, nothing given in this report, including recommended mitigation measures, is intended to authorize the incidental take of desert tortoises during site development. Such authorization must come from the appropriate regulatory agencies, including CDFG (i.e., authorization under section 2081 of the Fish and Game Code) and USFWS [i.e., authorization under section 10(a)(1)(B) of the Federal Endangered Species Act].

4.1.2. *Impacts.* Even in low density areas, such as occur along the ARZC ROW and within wellfield and spreading basin areas, tortoises could be adversely affected by both authorized and unauthorized activities (e.g., routine maintenance or well development prior to formal Project authorization).

Although most of the pipelines interconnecting the north-south and east-west grids between extraction wells will be buried, during the installation of these pipelines (and the main water conveyance pipeline within the ARZC ROW) tortoises and occupied habitats are most likely to be adversely affected, as compared to other Project components. If in the proposed pipeline alignments during construction, a tortoise could be accidentally crushed or become entrapped if trenches are left open. The increased presence of construction personnel in the area will predictably attract both coyotes and ravens, which are documented predators of adult and subadult tortoises, respectively. Similarly, if the spreading basins result in standing water during percolation, both coyotes and ravens are likely to be attracted to and benefit from this new regional water source.

Future impacts may include crushing burrows and construction or personnel vehicles accidentally crushing tortoises crossing the road. Schulyler Wash is an apparently important resource to many animals, including tortoises, which seem to concentrate their activities along this wash. Impeding flow of water to this wash by installing pipelines or creating berms at the spreading basin may constitute an adverse indirect impact to tortoises that are not otherwise directly affected. The project area drainage should be returned to its previous condition.

The extraction of ground water is not likely to affect upland vegetation. There is existing evidence water has been pumped into the wellfield areas from existing wells, creating lush habitat where creosote bushes and other plants have already responded with greener foliage and taller statures. Again, tortoise predators may be attracted to these temporary inundation areas.

4.1.3. *Mitigation Measures.* In the past, the regulatory agencies have equated tortoise sign with occupied habitat; there is no requirement that an animal be observed on-site. Both the USFWS and CDFG have required incidental take permits when tortoise sign (not animals) was the only evidence found. In fact, on 20 March 2002 USFWS issued a biological opinion for the previously proposed Cadiz pipeline project (USFWS 2002b) even though no tortoises had been observed during CMBC's 1999 studies.

Given the findings of this study, development of the water conveyance pipeline, extraction wells, and some ancillary facilities may adversely impact the desert tortoise, depending on the locations of those facilities (i.e., impacts may be more likely north of Old Woman Mountains along the ARZC ROW and in eastern portions of wellfield areas). Since the tortoise is a State-listed species, any adverse impacts would be considered significant under CEQA. Since it is a threatened species, Cadiz will either need to avoid or mitigate the impact.

Project development could result in the loss of occupied habitat and potential injury or death to tortoises occurring on the site, which would constitute "take" under State (CESA) and federal endangered species acts (FESA). As such, prior to development, Cadiz will likely need incidental take permits from the CDFG and USFWS.

Both the CDFG and USFWS must authorize incidental take, since both State and federal governments list the tortoise as threatened. Although there are stream courses within the pipeline alignment and wellfield area that will require a *Streambed Alteration Agreement* from the CDFG, these watercourses are probably not under the jurisdiction of the U.S. Army Corps of Engineers. Despite this, other components of the project may trigger federal involvement. Section 7 of FESA is available when a federal agency *finds, authorizes, or carries out* some portion of the project that *may affect* the desert tortoise. The federal action may be the issuance of a permit under section 404 of the Clean Water Act by the U.S. Army Corps of Engineers for a project that affects a jurisdictional water of the U.S. This determination is made by the U.S. Army Corps of Engineers.

If a federal nexus is not identified, then development of the site would need to be authorized under authority of a federal section 10(a)(1)(B) incidental take permit (i.e., 10a permit) and a State section 2081 incidental take permit. The CDFG has the option, under Section 2080.1, to adopt the federal permit and allow it to authorize take at the State level as well. Regardless, take permits will identify both *minimization measures* and *mitigation measures* to offset the impacts.

Minimization measures are applied on-site at the time of construction. As the name implies, the intent of these measures is to minimize direct impacts to tortoises and

occupied habitat. These measures typically include hiring a biological monitor to remove all tortoises from harm's way. Importantly, this project may require that tortoises are moved out of harm's way but mass translocation would NOT be required. Tortoise awareness programs are given to construction personnel who are prohibited from driving cross-country, littering, bringing pets into the area, etc.

Mitigation measures are applied off-site. In every 10a permit issued thus far for the tortoise, proponents have purchased compensation lands in tortoise conservation areas. Given the location of the subject property outside a DWMA, the compensation ratio would be 1:1. For each acre of impact, one acre would be acquired and conserved for the tortoise. Given the Project site's proximity to the Chemehuevi DWMA, that would likely be the best critical habitat unit and DWMA in which to acquire compensation habitat.

Collectively, these measures are part of a *conservation strategy* that is intended to *fully mitigate impacts to the maximum extent practicable*, as required by the USFWS. The CDFG's fully mitigate standard is worded somewhat differently, but the conservation strategy outlined in the 2081 permit would be the same as in the federal permit. For compliance with FESA, consultation with the USFWS and U.S. Army Corps of Engineers would be required to determine whether section 7 or 10a would be applicable.

4.2. Impacts to Other Biological Resources and Proposed Mitigation.

4.2.1 *Other Special Status Species.* The following subsections identify those special status plants and animals and other biological resources that may or may not be affected by Project development.

4.2.1.a. *Special Status Plants.* Given the information presented herein, that these species are likely absent or would have been detected if present, CMBC judges that none of the following special status plant species reported from the area would be significantly affected by Project development: White bear poppy, crucifixion thorn, las animas colubrina, Alverson's foxtail cactus, Howe's hedgehog cactus, Little San Bernardino Mountains linanthus, spear-leaf matela, Robison's monardella, short-joint beavertail cactus, white-margined beardtongue, Stephen's beardtongue, lobed ground-cherry, Orocopia sage, and Rusby's desert-mallow.

There is some unknown potential for the following plant species to occur, as they would not have been detected during CMBC's September-October 2010 surveys: small-flowered androstephium, Borrego milk-vetch, ribbed cryptantha, winged cryptantha, Utah vine milkweed, and slender cottonheads.

The County may require a Desert Native Plant Assessment to identify the numbers and locations of protected plants to be in compliance with the County Plant Protection Ordinance and California Native Plant Protection Act (County of San Bernardino 2006). The following species are known to occur on or adjacent to the Project area and may therefore be adversely affected at unknown levels by Project development: Harwood's milk-vetch, barrel cactus, silver cholla, beavertail cactus, pencil cholla, desert holly, catclaw acacia, palo verde, and smoke tree.

Rare Plant surveys were conducted by ESA biologist along the pipeline ROW. Findings of this report are included under separate cover within an appendix of the Draft EIR.

4.2.1.b. *Special Status Birds*. Given the information presented herein, CMBC judges that none of the following special status bird species reported from the area would be significantly affected by Project development: Northern harrier, sharp-shinned hawk, Swainson's hawk, ferruginous hawk, golden eagle, merlin, or long-eared owl. These species may incidentally occur in the area and occasionally forage there but none of them would nest in the Project area, so no significant impacts are anticipated. Development of the water conveyance pipeline within the ARZC ROW, construction of the wellfield interconnecting pipelines, and other ancillary facilities will affect only a fraction of the 8,249 acres comprising the Project site. Vaux's swift, observed as an incidental migrant through the area would also not be affected.

The status of western snowy plover and mountain plover within the Project area remain unknown. Snowy plovers would occur, if at all, in association with one of the regional dry lakes, Danby Lake being the most proximate to the Project area. However, since the ARZC ROW is located some distance from barren portions of Danby Lake, impacts to snowy plovers is not likely. Mountain plover is more likely to occur in fallow agricultural areas, such as comprise Section 27. Again its status in the Project area is unknown and impacts, if any, remain unknown.

A presence/absence survey for Mountain plover should be conducted prior to construction within all fallow agricultural areas being impacted by project implementation to determine whether or not impacts to the species would occur.

Bird species encountered during CMBC's 2010 survey included: burrowing owl, Cooper's hawk, prairie falcon, LeConte's thrasher, and loggerhead shrike.

For **burrowing owl**, CDFG (California Department of Fish and Game 1995) has stipulated that the following should be considered impacts to the species:

- *Disturbance within 50 meters (approximately 160 feet), which may result in harassment of owls at occupied burrows;*
- *Destruction of natural or artificial burrows (i.e., culverts, concrete slabs, and debris piles that provide shelter to burrowing owls); and*
- *Destruction and/or degradation of foraging habitat adjacent [within 100 meters (approximately 320 feet)] of an occupied burrow(s).*

If impacts cannot be avoided, specified mitigation measures include (a) avoiding occupied burrows during the breeding season, between February 1 and August 31; (b) purchasing and permanently protecting 6.5 acres of foraging habitat per pair or unpaired resident bird impacted; (c) creating new burrows or enhancing others when destruction of occupied burrows is unavoidable; (d) implementing passive relocation if owls must be moved; and (e) provide funding for long-term management and monitoring of protected lands.

Given this information, CMBC reiterates that it is highly advisable (and cost effective) to avoid impacts. CDFG (1995) states the following:

If avoidance is the preferred method of dealing with potential project impacts, then no disturbance should occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season of September 1 through January 31 or within 75 meters (approximately 250 feet) during the breeding season of February 1 through August 31. Avoidance also requires that a minimum of 6.5 acres of foraging habitat be permanently preserved contiguous with occupied burrow sites for each pair of breeding burrowing owls (with or without dependent young) or single unpaired resident bird. The configuration of the protected habitat should be approved by the Department [CDFG].

CMBC contacted the CDFG, Bermuda Dunes office, to inquire about the Project site, CDFG³ staff indicated that it would be appropriate to perform breeding burrowing owl surveys as a follow-up to this habitat assessment. Based on the findings of the burrowing owl survey, CDFG would then advise Cadiz of appropriate steps to either avoid impacts or mitigate them according to latest CDFG standards.

Like the other raptor species mentioned above, **Cooper's hawk** and **prairie falcon** are more likely to forage in the area than nest. Only an incremental amount of potential foraging habitat would be lost to Project development. Based on the minimal availability of foraging habitat for these species, no mitigation measures are recommended.

Both **LeConte's thrasher** and **loggerhead shrike** were encountered during surveys, although shrikes appear to be much more common and ubiquitously distributed than LeConte's thrasher. Even so, both are likely to be primarily associated with the well-developed washes in the area, particularly those vegetated by smoke tree, desert willow, and palo verde, and in particular, Schulyler Wash. Both species are likely to nest in these areas during the spring and have young present through the summer. Minimizing impacts to wash areas at all times is recommended. Breeding and nesting activities occur between late February and early June, although the sensitivity of nesting birds to proximate construction activities is unknown. LaRue has observed both species persist at nest sites in spite of proximate construction activities.

4.2.1.c. *Special Status Mammals.* Insufficient information is available to determine if Project development would affect the following special status mammal species: California leaf-nosed bat, Arizona myotis, cave myotis, spotted bat, Townsend's big-eared bat, pocket free-tailed bat, big free-tailed bat, western mastiff bat, fringed myotis, and southern grasshopper mouse. Ship Mountains, Old Woman Mountains, and Kilbeck Hills are the three areas proximate to the ARZC ROW most likely to support roosting locations and/or colonies for some of these bat species. The status of grasshopper mouse remains unknown in the project area. In the absence of focused

³ Personal correspondence with Jim Sheridan, CDFG Bermuda Dunes Office, on 27 September 2010.

studies for these species, CMBC cannot determine the level of impacts that may occur or recommend mitigation measures. Surveys should be conducted prior to construction to ascertain the potential presence of these species. If these species are present, avoidance measures should be implemented to minimize effects.

For **pallid bats**, the surveys were sufficient to detect more than 160 individual bats at 22 of the 70 trestles inspected. In two places, smaller bats were seen with the larger ones, likely indicating local reproduction. It is also noteworthy that a pair of pallid bats was detected under one of these trestles east of Kilbeck Hills in May 1999, indicating some tenacity and long-term occupation of these trestles by the species. If no pallid bats are using the same types of trestles under the BNSF rail line that crosses through the well fields, this may suggest that the ARZC line is uniquely suited for occupation by pallid bats. In any case, this is considered a regionally significant resource for the species.

These bats were detected late enough in the year that we cannot determine if the trestles are serving as maternity roosts and early enough in the year that we cannot determine if they are serving as winter hibernacula, which is an important consideration in determining both the level of impact and recommended mitigation measures (Tom Egan, AMEC Earth and Environmental, personal communication on 5 November 2010). If pallid bats are using the trestles for one or the other, but not both, it may be possible to schedule construction during a time of year when pallid bats are absent. We also do not know how tolerant pallid bats are of proximate construction activities, but do know that pipeline installation would occur within 100 feet of trestles occupied by these bats. As suggested above with other bat species, it would be appropriate to conduct both winter and spring surveys along the pipeline alignment by qualified bat experts to determine these questions and get their input on likely impacts and recommended mitigation measures.

American badgers, though not observed, occur throughout all Project areas. No primary burrow systems were observed, though evidence of their foraging is ubiquitous. Installation of pipeline and construction of ancillary facilities is not likely to kill any badgers but may cause them to disperse into adjacent areas, which is not considered to be a significant impact.

4.2.2. *Other Protected Biological Resources.* Impacts to washes, such as spoil deposition or alteration, are regulated by the CDFG. Impacts to the wash on-site will likely require a 1601-03 Streambed Alteration Agreement from CDFG. CMBC's jurisdictional waters analysis will be provided as baseline information for this agreement. At the time of this writing, CDFG biologist, Jim Sheridan in the Bermuda Dunes office is the appropriate contact.

Herein, CMBC has iterated the relative effectiveness of the drainages and ponding areas in establishing the more robust desert habitat on the north and east sides of the ARZC line. Numerous passerine birds were observed in this area, as were predator scat, such as coyotes and bobcats.

At the time of this writing, Cadiz has not finalized its engineering plans for this pipe but has indicated that it may cross under the ARZC rail line in as many as four or five places. CMBC emphasizes that it is *highly advisable to install the pipeline along the south and west sides of the tracks* where existing disturbances such as dirt roads and trails are prevalent and where the more robust habitat would be avoided.

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Appendix A. Plant Species Detected

The following plant species were identified on-site during the general biological inventory described in this report. Those plant species that are protected by pertinent County and/or State ordinances are signified by “(SC)” following the common name. Those species first found along the pipeline are preceded by “P.” Those species that may occur along the pipeline but were only detected within the wellfield area are denoted by “W.”

GNETAE

Ephedraceae

W *Ephedra californica*

ANGIOSPERMAE: DICOTYLEDONES

Amaranthaceae

P *Tidestromia oblongifolia*

Asclepiadaceae

P *Asclepias erosa*

P *Asclepias subulata*

P *Sarcostemma hirtellum*

Asteraceae

P *Ambrosia dumosa*

P *Atrichoseris platyphylla*

W *Baileya* sp.

P *Bebbia juncea*

P *Chaenactis fremontii*

P *Chrysothamnus paniculatus*

W *Dicoria canescens*

P *Encelia actoni*

P *Encelia frutescens*

P *Geraea canescens*

P *Hymenoclea salsola*

P *Malacothrix glabrata*

W *Monoptilon bellioides*

P *Palafoxia linearis*

W *Pectis papposa*

W *Pluchea sericea*

P *Porophyllum gracile*

P *Psathyrotes ramosissima*

P *Stephanomeria exigua*

P *Stephanomeria pauciflora*

GNETAE

Joint-fir family

Desert tea

DICOT FLOWERING PLANTS

Amaranth family

Honeysweet

Milkweed family

Milkweed

Milkweed

Hairy milkweed

Sunflower family

Burrobush

Gravelghost

Woolly marigold

Sweetbush

Desert pincushion

Wash rabbitbrush

Dicoria

Acton encelia

Rayless encelia

Desert sunflower

Cheesebush

Desert dandelion

Gray desert star

Desert Spanish-needles

Chinch weed

Arrow weed

Odora

Velvet rosettes

Milk aster

Desert milk aster

Bignoniaceae

W *Chilopsis linearis* ssp. *arcuata*

Boraginaceae

P *Amsinckia tessellata*
 P *Cryptantha angustifolia*
 P *Cryptantha barbiger*
 P *Cryptantha nevadensis*
 P *Cryptantha pterocarya*
 W *Pectocarya heterocarpa*
 W *Pectocarya penicillata*
 P *Pectocarya platycarpa*
 P *Pectocarya recurvata*
 P *Tiquilia plicata*

Brassicaceae

P **Brassica tournefortii*
 P **Descurainia pinnata*
 P **Descurainia sophia*
 W *Guillenia lasiophylla*
 P *Lepidium flavum*
 W *Lepidium lasiocarpum*
 P **Sisymbrium irio*

Cactaceae

P *Ferocactus cylindraceus* (*acanthodes*)
 P *Opuntia basilaris*
 P *Opuntia echinocarpa*
 W *Opuntia ramosissima*

Capparaceae

P *Isomerus arborea*

Chenopodiaceae

P *Atriplex canescens*
 P *Atriplex hymenelytra*
 P *Atriplex polycarpa*
 P **Salsola tragus*
 P *Suaeda moquinii*

Cucurbitaceae

P *Cucurbita palmata*

Cuscutaceae

P *Cuscuta* sp.

Bigonia family

Desert willow

Borage family

Fiddleneck
 Narrow-leaved forget-me-not
 Fuzzy forget-me-not
 Nevada forget-me-not
 Wing-nut forget-me-not
 Combseed
 Slender combseed
 Broad-margined combseed
 Curved combseed
 Plicate coldenia

Mustard family

Saharan mustard
 Tansy
 Flixweed
 California mustard
 Peppergrass
 Sand peppergrass
 London rocket

Cactus family

Barrel cactus (SC)
 Beavertail cactus (SC)
 Silver cholla (SC)
 Pencil cholla (SC)

Caper family

Bladderpod

Goosefoot family

Four-winged saltbush
 Desert holly (SC)
 Allscale
 Russian thistle
 Torrey's sea-blight

Gourd family

Coyote gourd

Dodder family

Dodder

Euphorbiaceae

- P *Chamaesyce (Euphorbia) polycarpa*
- P *Ditaxis neomexicana*

Fabaceae

- P *Acacia greggii*
- P *Cercidium floridum*
- P *Dalea mollissima*
- P *Lupinus c.f. arizonicus*
- P *Marina orcuttii* var. *orcuttii*
- P *Psorothamnus (Dalea) emoryi*
- P *Psorothamnus spinosus*

Geraneaceae

- P **Erodium cicutarium*

Hydrophyllaceae

- W *Nama demissum*
- P *Phacelia c.f. tanacetifolia*

Krameriaceae

- P *Krameria grayi*

Lamiaceae

- P *Hyptis emoryi*
- P *Salvia columbariae*

Loasaceae

- P *Mentzelia* sp.
- P *Mentzelia c.f. albicaulis*
- P *Mentzelia laevicaulis*
- P *Petalonyx nitidus*
- P *Petalonyx thurberi*

Malvaceae

- P *Eremalche rotundifolia*

Nyctaginaceae

- P *Mirabilis bigelovii*

Onagraceae

- P *Camissonia boothii*
- P *Camissonia brevipes*
- P *Camissonia claviformis*
- P *Oenothera c.f. deltoides*

Spurge family

- Sandmat
- Ditaxis

Pea family

- Catclaw acacia (SC)
- Palo verde (SC)
- Dalea
- Arizona lupine
- California marina
- Indigo bush
- Smoke tree (SC)

Geranium family

- Red-stemmed filaree

Water-leaf family

- Purple mat
- Phacelia

Krameria family

- White rhatany

Mint family

- Desert lavender
- Chia

Stick-leaf family

- Blazing star
- Little blazing star
- Blazing star
- Sniny-leaved sandpaper plant
- Sandpaper plant

Mallow family

- Desert fivespot

Four o'clock family

- Desert wishbone plant

Evening-primrose family

- Red primrose
- Yellow cups
- Brown-eyed primrose
- Devil's lantern

Orobanchaceae

P *Orobanche cooperi*

Plantaginaceae

P *Plantago ovata*

Polemoniaceae

P *Gilia* sp.

P *Loeseliastrum (Langloisia) matthewsii*

P *Loeseliastrum (Langloisia) schottii*

P *Linanthus* c.f. *dichotomus*

Polygonaceae

P *Chorizanthe brevicornu*

P *Chorizanthe rigida*

P *Eriogonum inflatum*

P *Eriogonum nidularium*

P *Eriogonum trichopes*

W *Eriogonum viridescens*

Resedaceae

P *Oligomeris linifolia*

Solanaceae

P *Datura wrightii (meteloides)*

P *Nicotiana obtusifolia (trigonophylla)*

P *Physalis crassifolia*

Tamaricaceae

P **Tamarix aphylla*

P **Tamarix ramosissima*

Viscaceae

P *Phorodendron californicum*

Zygophyllaceae

P *Larrea tridentata*

W **Tribulus terrestris*

ANGIOSPERMAE: MONOCOTYLEDONES

Liliaceae

P *Hesperocallis undulata*

P *Zidagenus brevibracteatus*

Broom-rape family

Cooper's strangler

Plantain family

Plantain

Phlox family

Gilia

Sunbonnets

Loeseliastrum

Evening snow

Buckwheat family

Brittle spineflower

Rigid spineflower

Desert trumpet

Whiskbroom

Little trumpet

Buckwheat

Mignonette family

Narrowleaf oligomeris

Nightshade family

Jimsonweed

Desert tobacco

Thick-leaf ground-cherry

Tamarisk family

Athel

Tamarisk

Mistletoe family

Mesquite mistletoe

Caltrop family

Creosote bush

Puncture vine

MONOCOT FLOWERING PLANTS

Lily family

Desert lily

Desert camas

Poaceae

P *Pleuraphis (Hilaria) rigida*

P **Schismus* sp.

P *Vulpia octiflora*

Grass family

Big galleta

Split-grass

Vulpia

* - indicates a non-native (introduced) species.

c.f. - compares favorably to a given species when the actual species is unknown.

Some species may not have been detected because of the seasonal nature of their occurrence. Common names are taken from Beauchamp (1986), Hickman (1993), Jaeger (1969), and Munz (1974).

Appendix B. Animal Species Detected

The following animal species were detected during the 2010 general biological inventory described in this report. Special status animal species are signified by “(SC)” following the common names. Although highly mobile and capable of occurring throughout the project area, those species first found along the pipeline are preceded by “P” and those first found within the wellfield area are denoted by “W.”

REPTILIA

Testudinidae

P & W *Gopherus agassizii*

Gekkonidae

W *Coleonyx variegatus*

Iguanidae

P *Dipsosaurus dorsalis*

P *Sauromalus obesus*

P *Callisaurus draconoides*

P *Uma scoparia*

P *Gambelia wislizenii*

P *Sceloporus magister*

P *Uta stansburiana*

P *Urosaurus graciosus*

P *Phrynosoma platyrhinos*

Xantusiidae

W *Xantusia vigilis*

Teiidae

P *Cnemidophorus tigris*

Colubridae

P *Masticophis flagellum*

W *Salvadora hexalepis*

W *Pituophis melanoleucus*

Viperidae

P *Crotalus cerastes*

REPTILES

Land tortoises

Desert tortoise (SC)

Geckos

Western banded gecko

Iguanids

Desert iguana

Common chuckwalla

Zebra-tailed lizard

Mojave fringe-toed lizard (SC)

Long-nosed leopard lizard

Desert spiny lizard

Side-blotched lizard

Long-tailed brush lizard

Desert horned lizard

Night lizards

Desert night lizard

Whiptails

Western whiptail

Colubrids

Red racer

Western patch-nosed snake

Gopher snake

Vipers

Sidewinder

AVES

Gaviidae

W *Gavia immer*

Pelecanidae

W *Pelecanus erythrorhynchos*

Anatidae

W *Anas platyrhynchos*

Cathartidae

W *Cathartes aura*

Accipitridae

W *Accipiter cooperii*

P *Buteo jamaicensis*

Falconidae

P *Falco sparverius*

P *Falco mexicanus*

Phasianidae

P *Alectoris chukar*

P *Callipepla gambelii*

Recurvirostridae

P *Recurvirostra americana*

Charadriidae

P *Charadrius vociferus*

Columbidae

W *Streptopelia decaocto*

P *Zenaida macroura*

Cuculidae

P *Geococcyx californianus*

Tytonidae

P *Tyto alba*

Strigidae

W *Bubo virginianus*

P & W *Athene cunicularia*

BIRDS

Loons

Common loon

Pelicans

American white pelican

Ducks, geese and swans

Mallard

Vultures

Turkey vulture

Hawks, eagles, harriers

Cooper's hawk (SC)

Red-tailed hawk

Falcons

American kestrel

Prairie falcon (SC)

Grouse and quail

Chukar

Gambel's quail

Stilts and avocets

American avocet

Plovers

Killdeer

Pigeons and doves

Eurasian collared-dove

Mourning dove

Cuckoos

Greater roadrunner

Barn Owls

Common barn owl

Typical owls

Great horned owl

Burrowing owl (SC)

Camprimulgidae

P *Chordeiles acutipennis*

Apodidae

P *Chaetura vauxi*

Tyrannidae

P *Sayornis saya*

Alaudidae

P *Eremophila alpestris*

Hirundinidae

P *Stelgidopteryx serripennis*

W *Hirundo rustica*

Corvidae

P *Corvus corax*

Remizidae

P *Auriparus flavipes*

Troglodytidae

P *Salpinctes obsoletus*

Cinclidae

Cinclus mexicanus

Muscicapidae

W *Regulus calendula*

P *Polioptila caerulea*

P *Polioptila melanura*

Mimidae

P *Mimus polyglottos*

W *Oreoscoptes montanus*

P *Toxostoma lecontei*

Motacillidae

W *Anthus spinoletta*

Laniidae

P *Lanius ludovicianus*

Vireonidae

W *Vireo huttoni*

Nightjars

Lesser nighthawk

Swifts

Vaux's swift (SC)

Tyrant flycatchers

Say's phoebe

Larks

Horned lark

Swallows

Northern rough-winged swallow

Barn swallow

Crows and jays

Common raven

Verdins

Verdin

Wrens

Rock wren

Dippers

American dipper

Thrushes and allies

Ruby-crowned kinglet

Blue-gray gnatcatcher

Black-tailed gnatcatcher

Mockingbirds and thrashers

Northern mockingbird

Sage thrasher

LeConte's thrasher (SC)

Wagtails and pipits

Water pipit

Shrikes

Loggerhead shrike (SC)

Vireos

Hutton's vireo

Emberizidae

P *Vermivora celata*
 W *Dendroica coronata*
 P *Geothlypis trichas*
 P *Wilsonia pusilla*
 P *Spizella breweri*
 W *Chondestes grammacus*
 P *Amphispiza bilineata*
 P *Amphispiza belli*
 P *Zonotrichia leucophrys*
 W *Agelaius phoeniceus*
 P *Sturnella neglecta*
 W *Xanthocephalus xanthocephalus*
 P *Euphagus cyanocephalus*
 W *Quiscalus mexicanus*

Fringillidae

W *Carduelis psaltria*
 P *Carpodacus mexicanus*

MAMMALIA

Vespertilionidae

P *Antrozous pallidus*

Leporidae

P *Lepus californicus*
 P *Sylvilagus audubonii*

Sciuridae

P *Spermophilus tereticaudis*
 P *Ammospermophilus leucurus*

Geomyidae

P *Thomomys bottae*

Heteromyidae

P *Dipodomys* sp.
 P *Dipodomys deserti*

Cricetidae

P *Neotoma lepida*

Canidae

P *Canis latrans*
 P *Vulpes macrotis*

Sparrows, warblers, tanagers

Orange-crowned warbler
 Yellow-rumped warbler
 Common yellowthroat
 Wilson's warbler
 Brewer's sparrow
 Lark sparrow
 Black-throated sparrow
 Sage sparrow
 White-crowned sparrow
 Red-winged blackbird
 Western meadowlark
 Yellow-headed blackbird
 Brewer's blackbird
 Great-tailed grackle

Finches

Lesser goldfinch
 House finch

MAMMALS

Evening bats

Pallid bat (SC)

Hares and rabbits

Black-tailed hare
 Audubon cottontail

Squirrels

Round-tailed ground squirrel
 Antelope ground squirrel

Pocket gophers

Botta pocket gopher

Pocket mice

Kangaroo rat
 Desert kangaroo rat

Rats and mice

Desert wood rat

Foxes, wolves and coyotes

Coyote
 Kit fox

Mustelidae

P & W *Taxidea taxus*

Weasels and skunks

American badger (SC)

Felidae

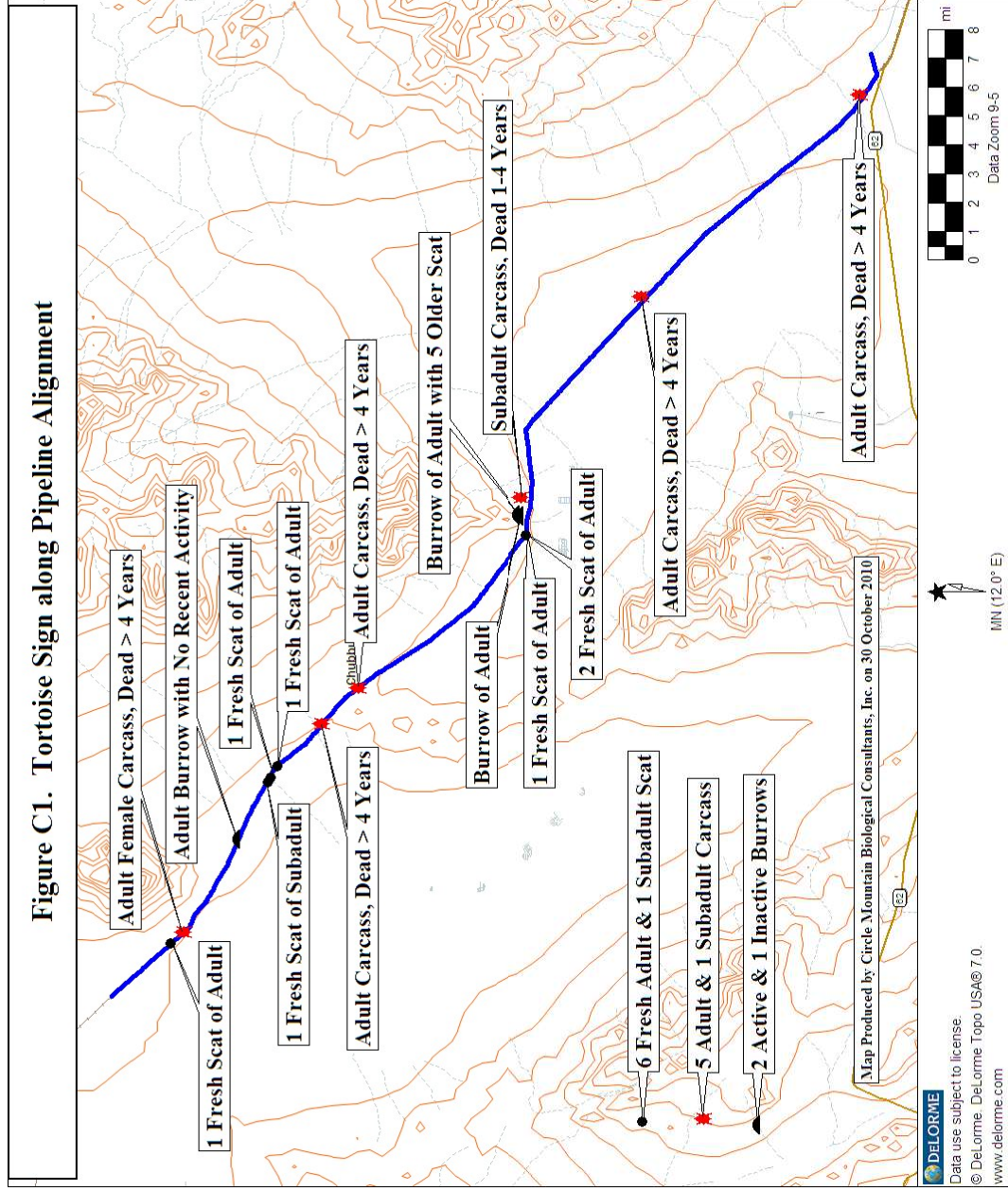
P *Lynx rufus*

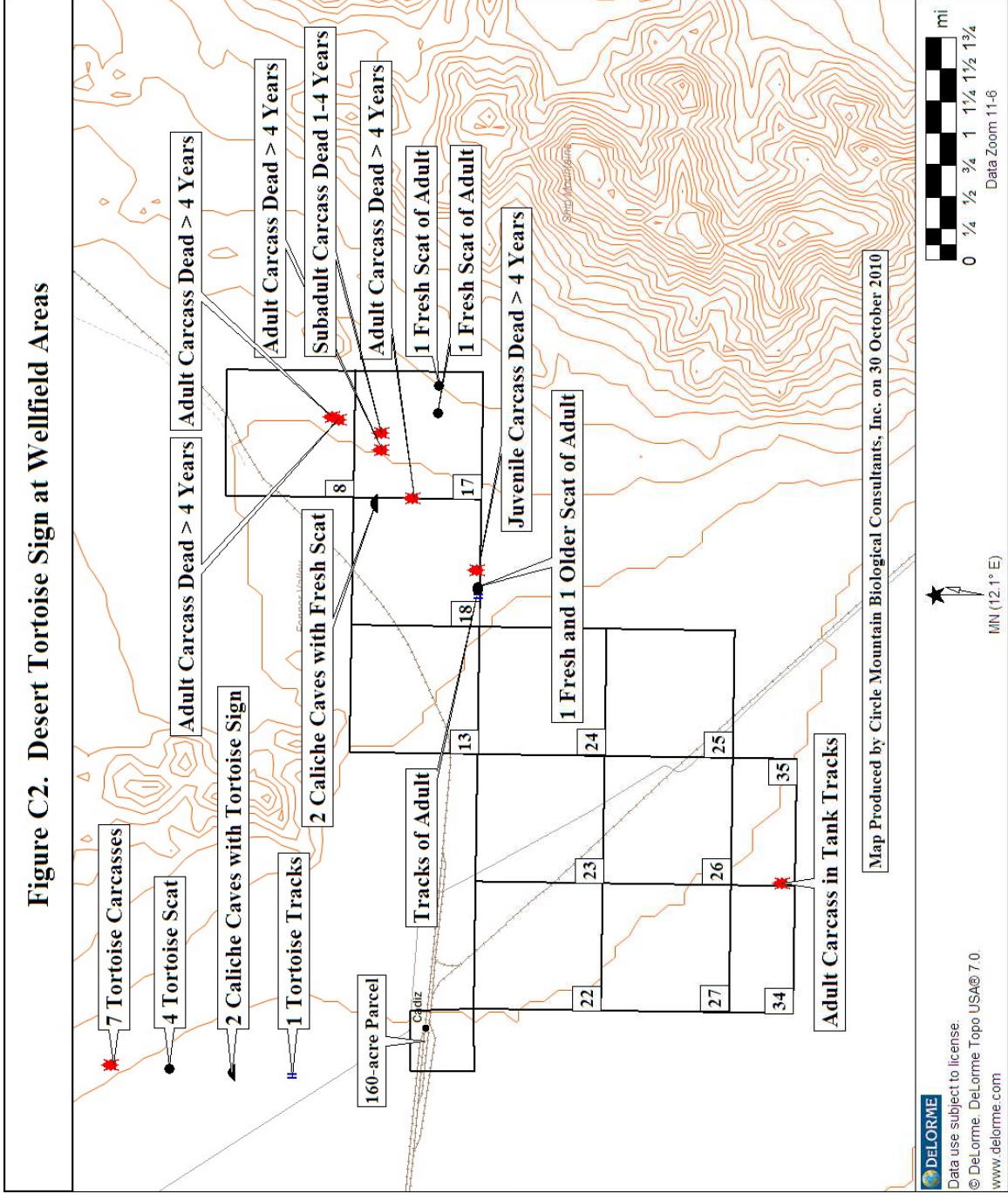
Cats

Bobcat

Nomenclature follows Stebbins, *A Field Guide to Western Reptiles and Amphibians* (2003), third edition; Sibley, National Audubon Society, the Sibley Guide to Birds (2000), first edition; and Ingles, *Mammals of the Pacific States* (1965), second edition.

Appendix C. Locations of Desert Tortoise Sign





Appendix D. Locations of Burrowing Owl Sign and Burrows

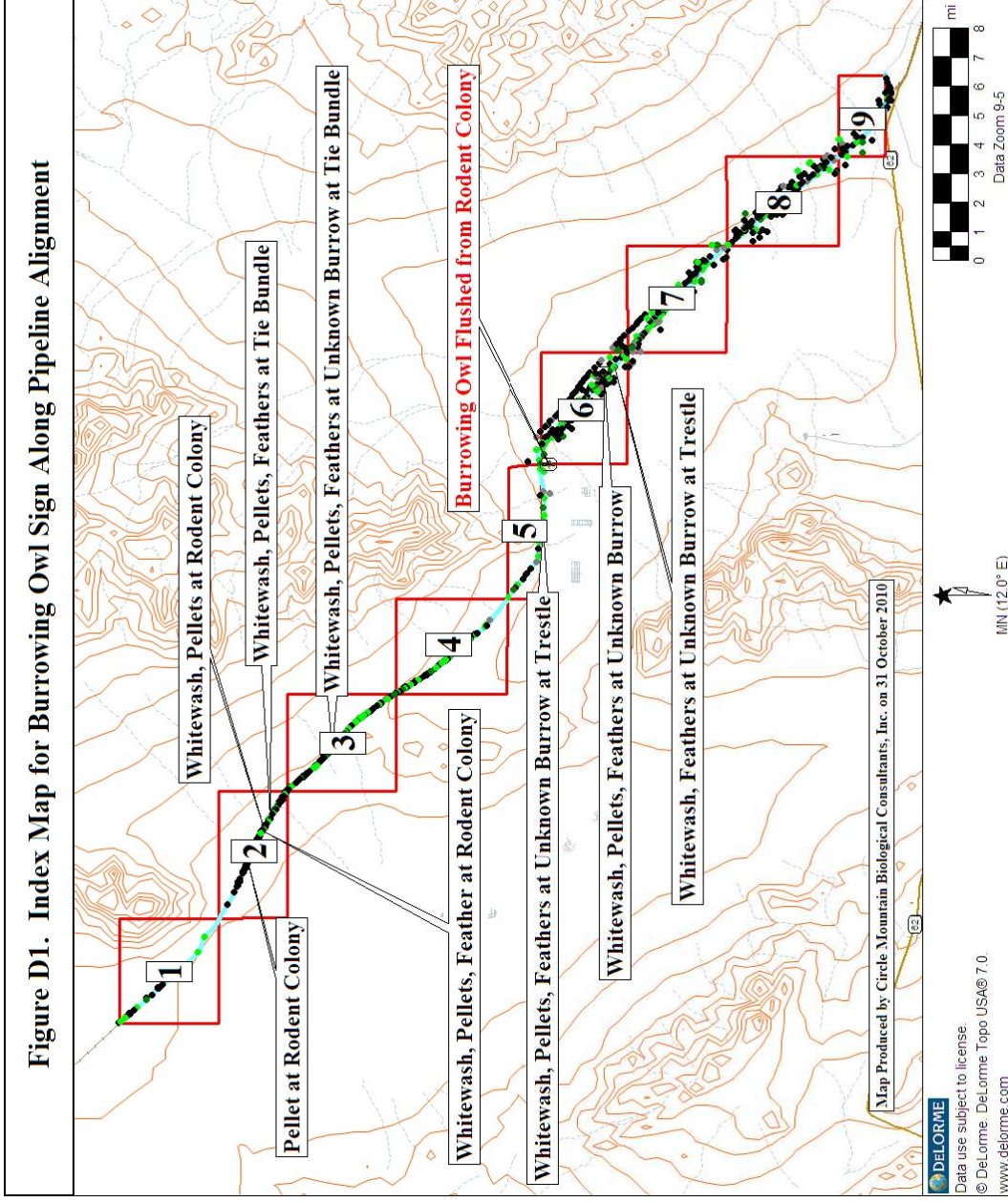


Figure D2. Burrow Data for Area 1 along Pipeline Alignment

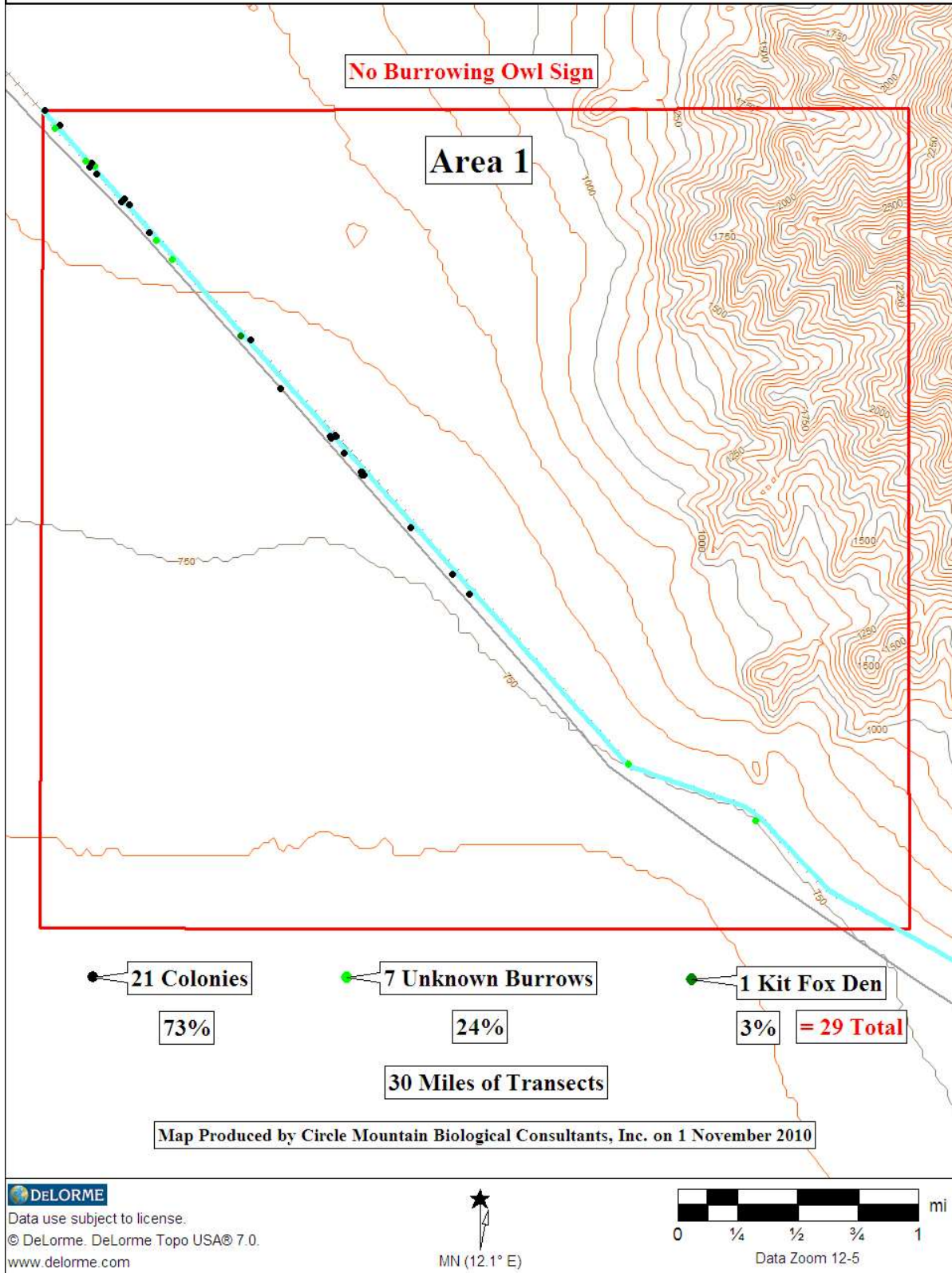


Figure D3. Burrow Data for Area 2 along Pipeline Alignment

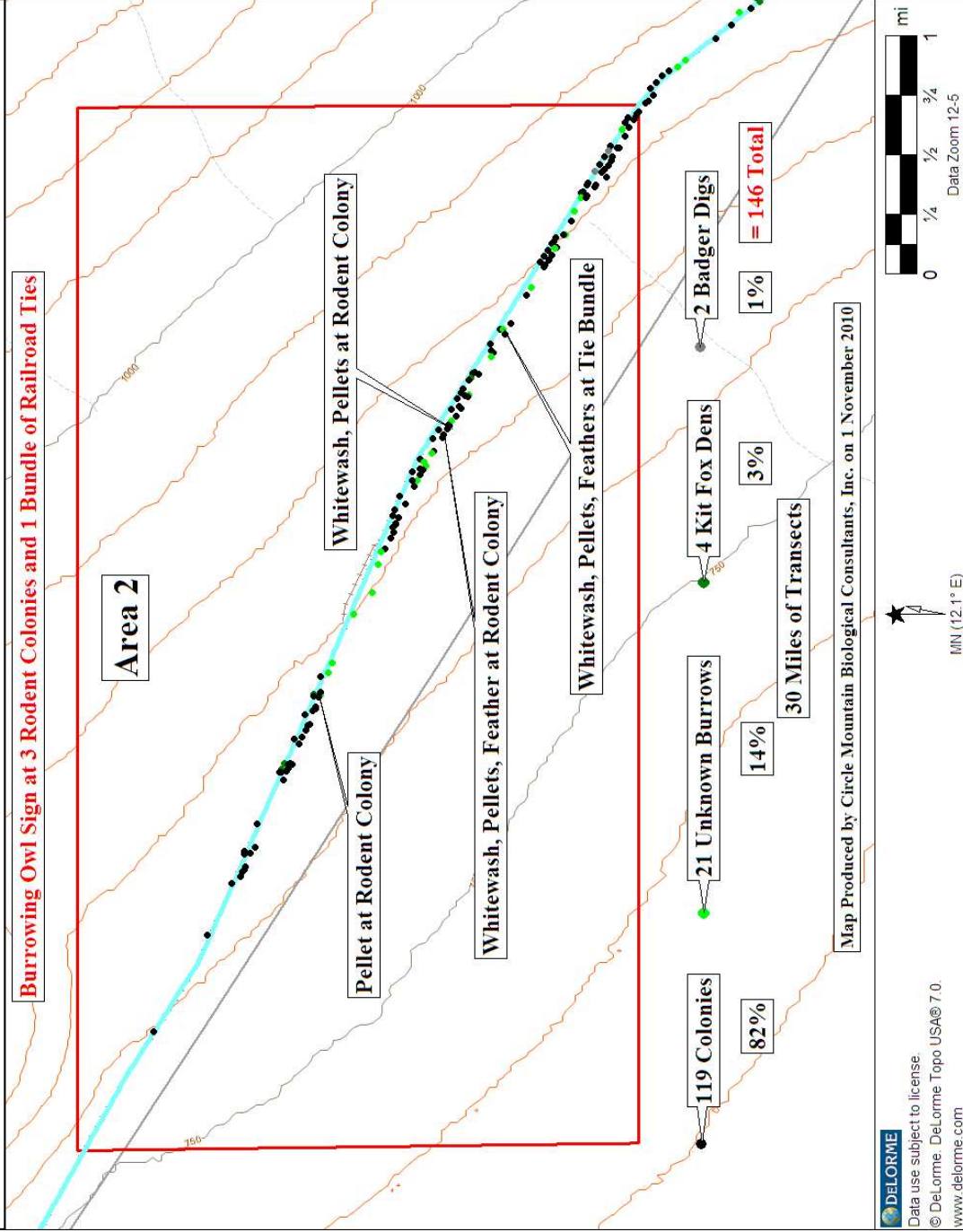


Figure D4. Burrow Data for Area 3 along Pipeline Alignment

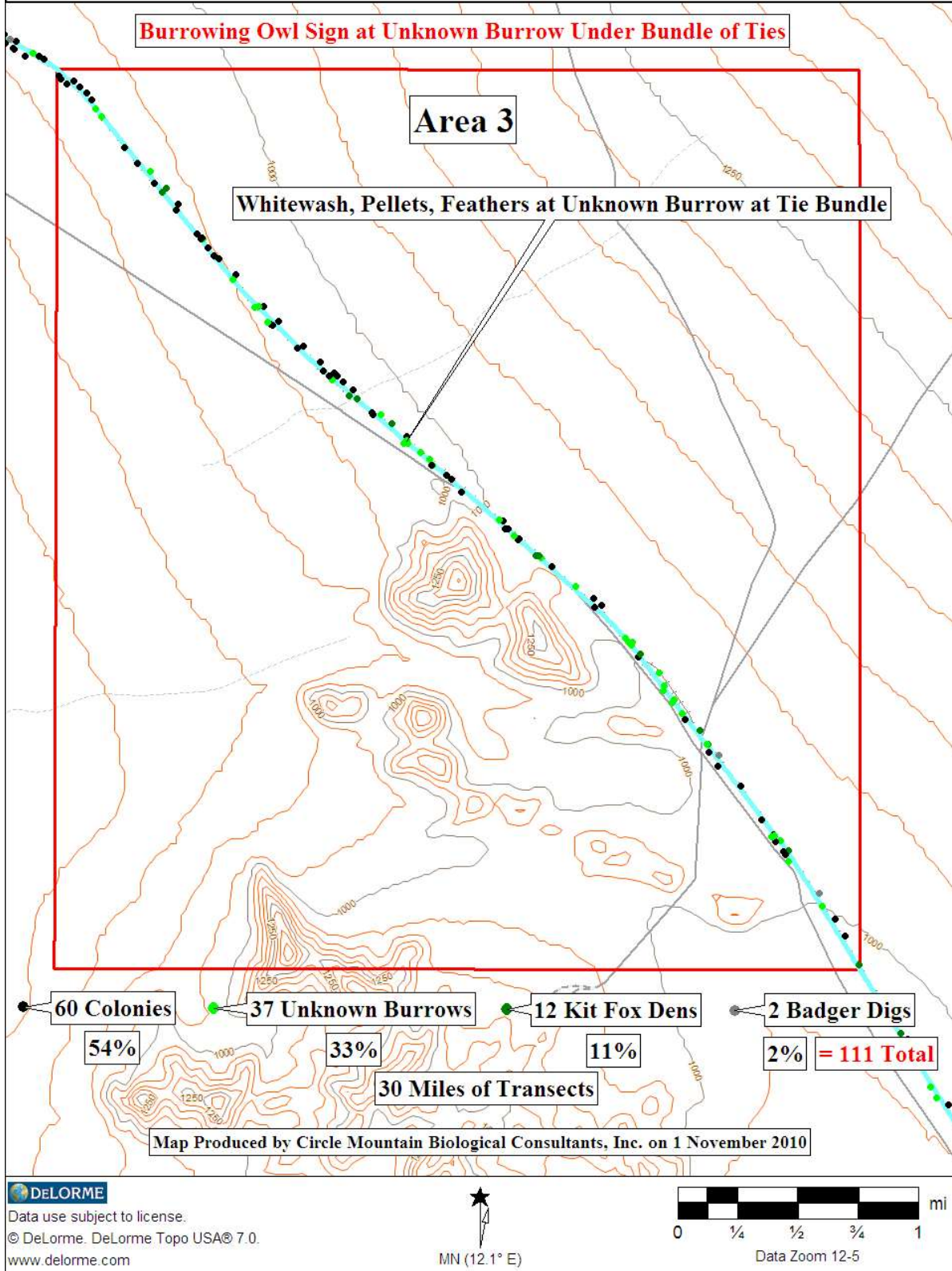


Figure D5. Burrow Data for Area 4 along Pipeline Alignment

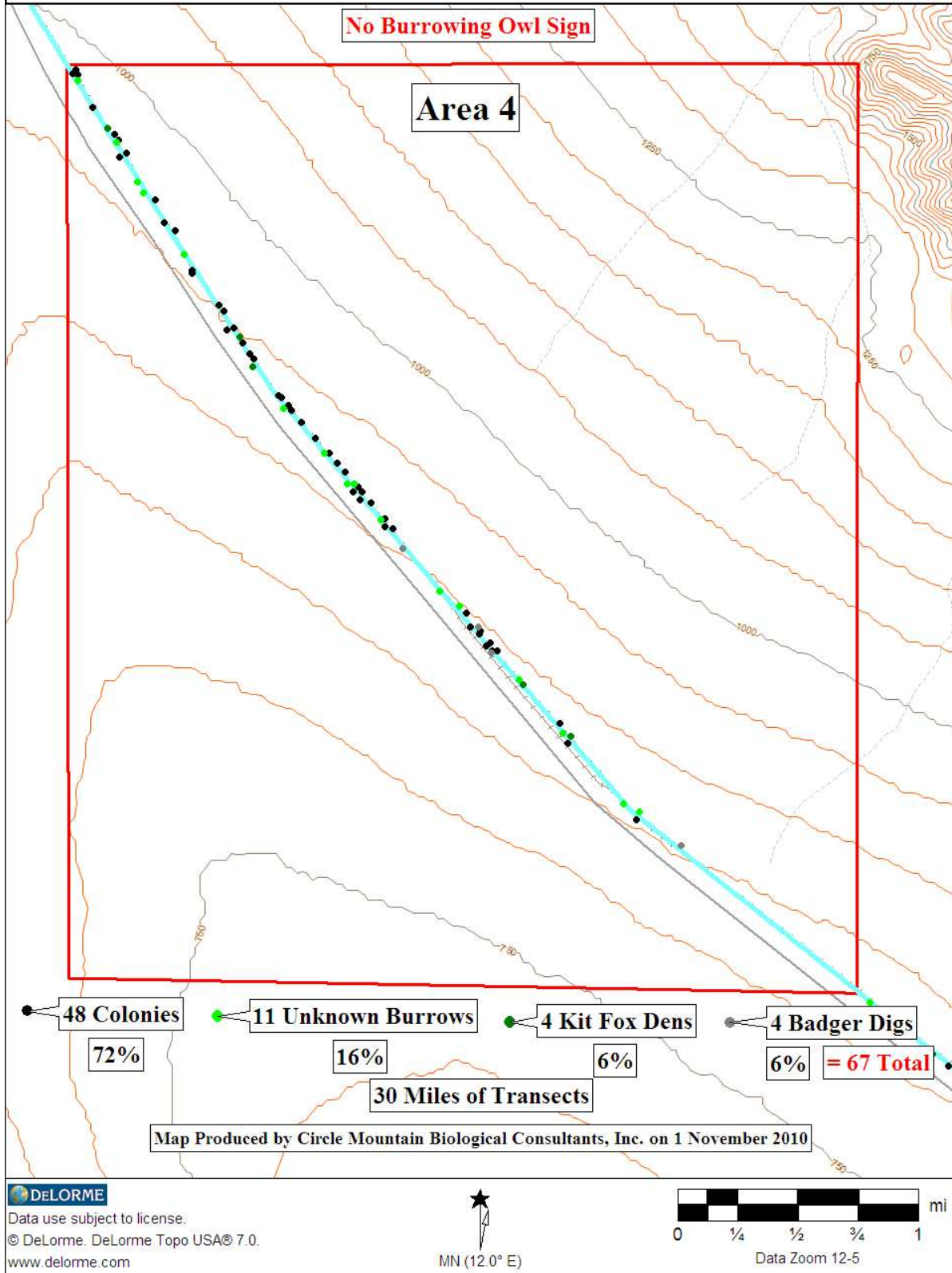


Figure D6. Burrow Data for Area 5 along Pipeline Alignment

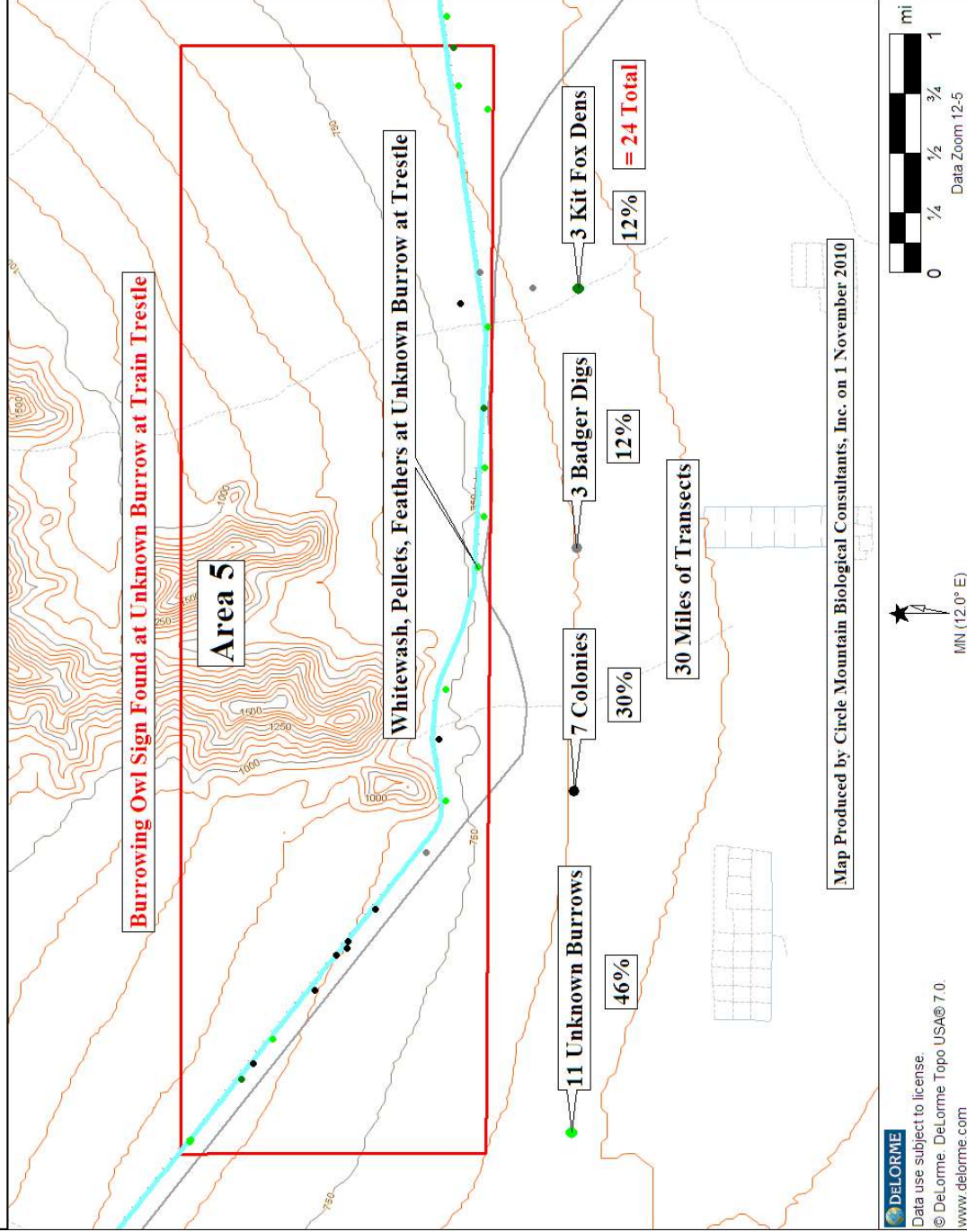


Figure D7. Burrow Data for Area 6 along Pipeline Alignment

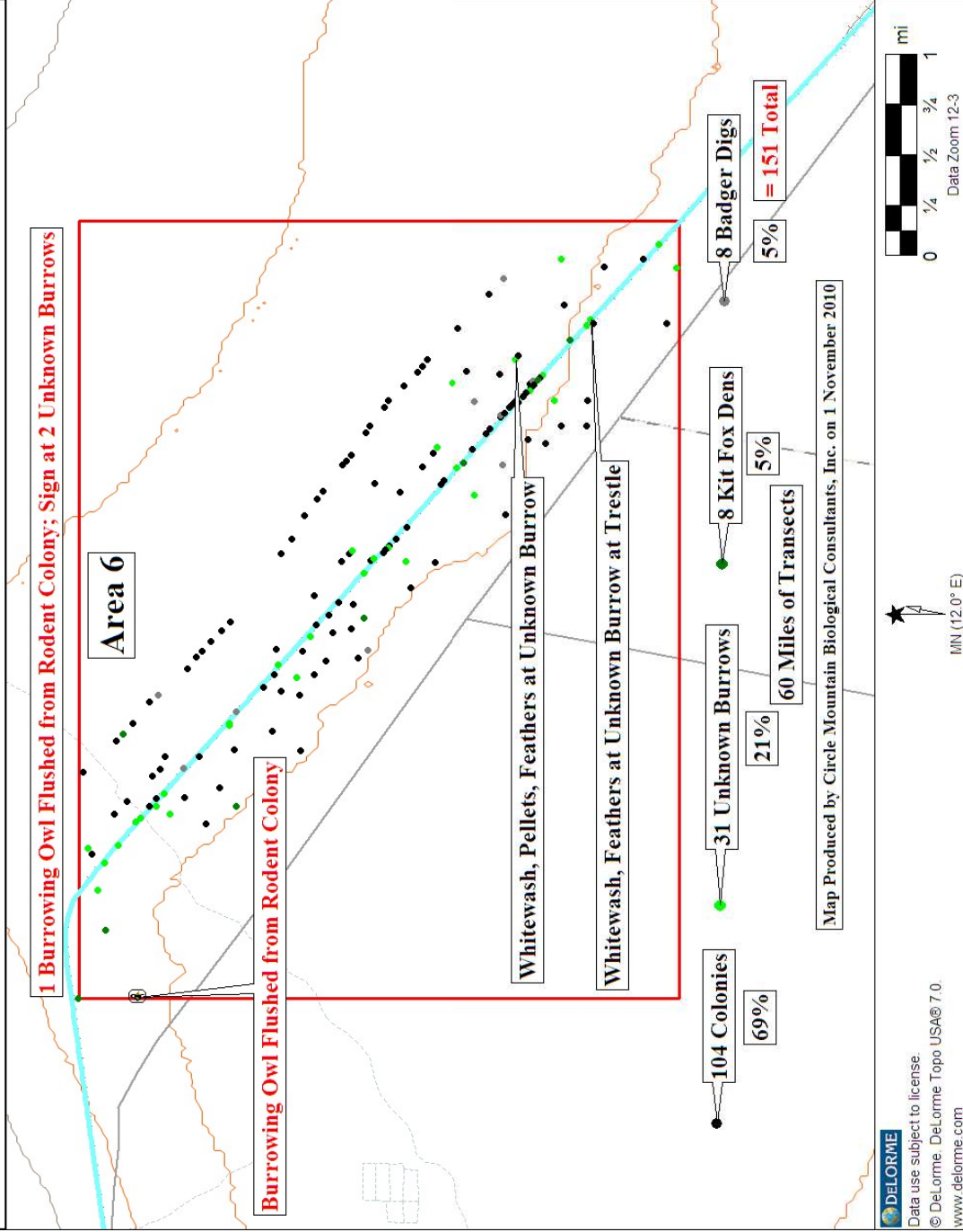


Figure D8. Burrow Data for Area 7 along Pipeline Alignment

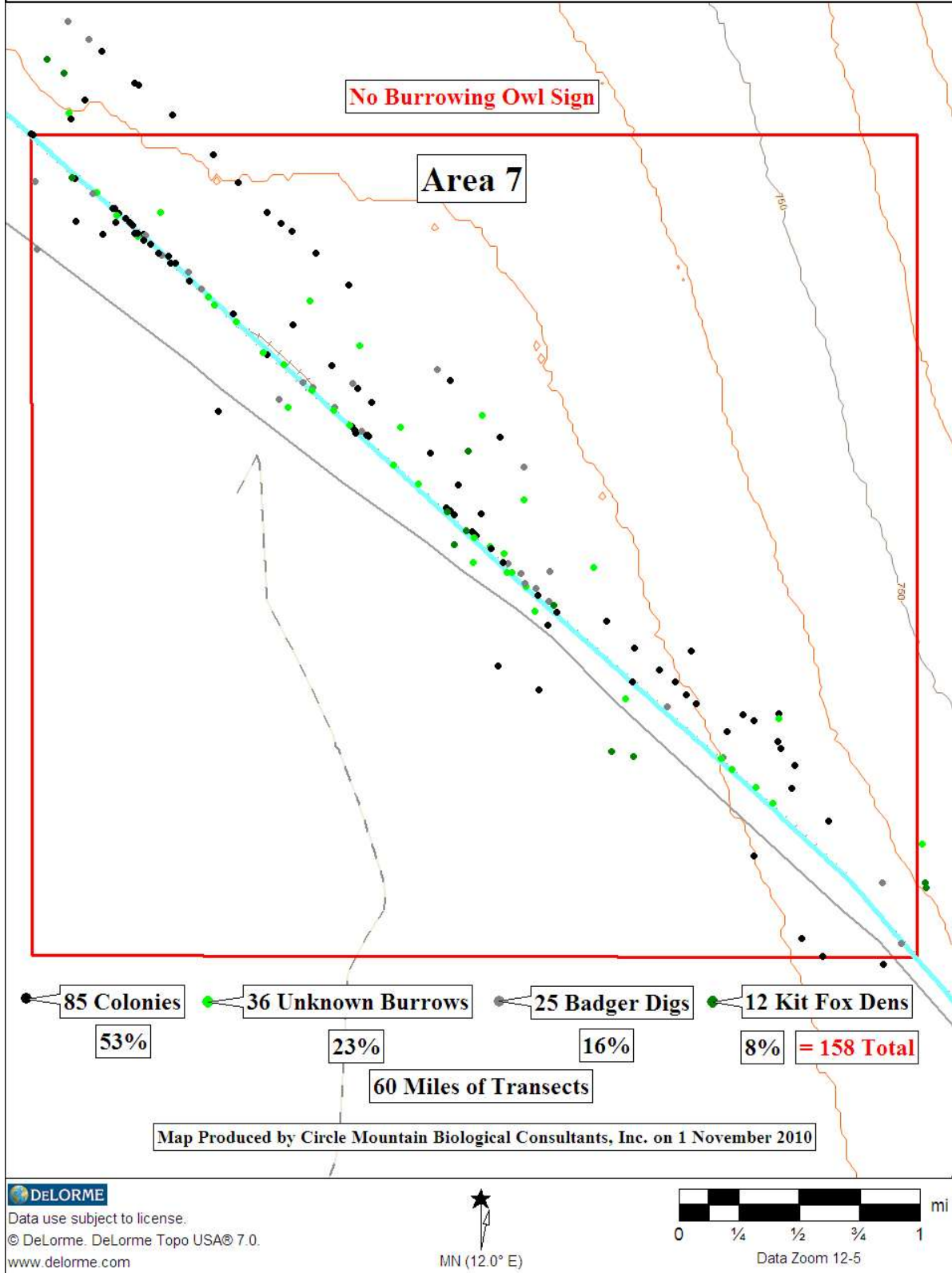


Figure D9. Burrow Data for Area 8 along Pipeline Alignment

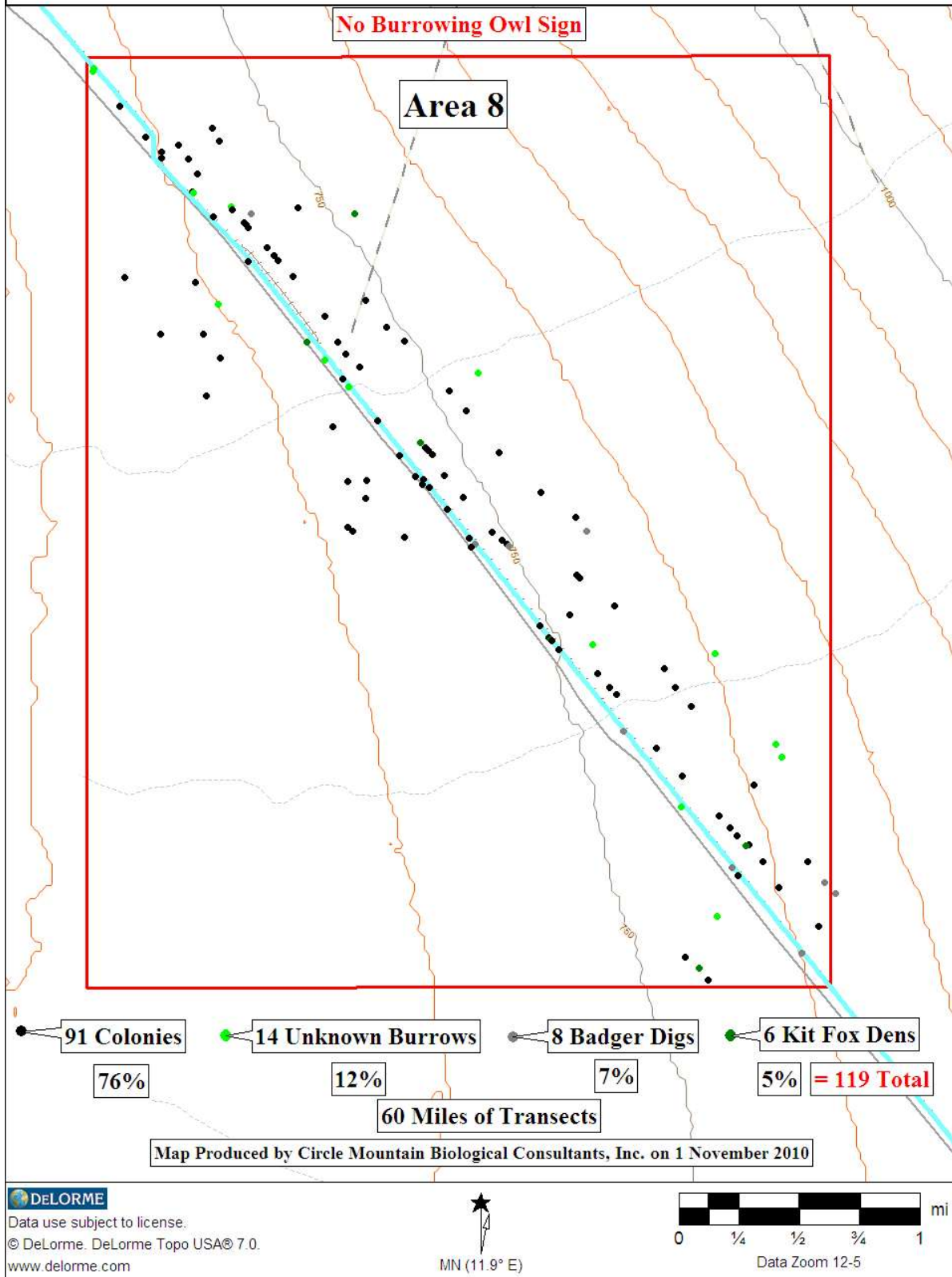


Figure D10. Burrow Data for Area 9 along Pipeline Alignment

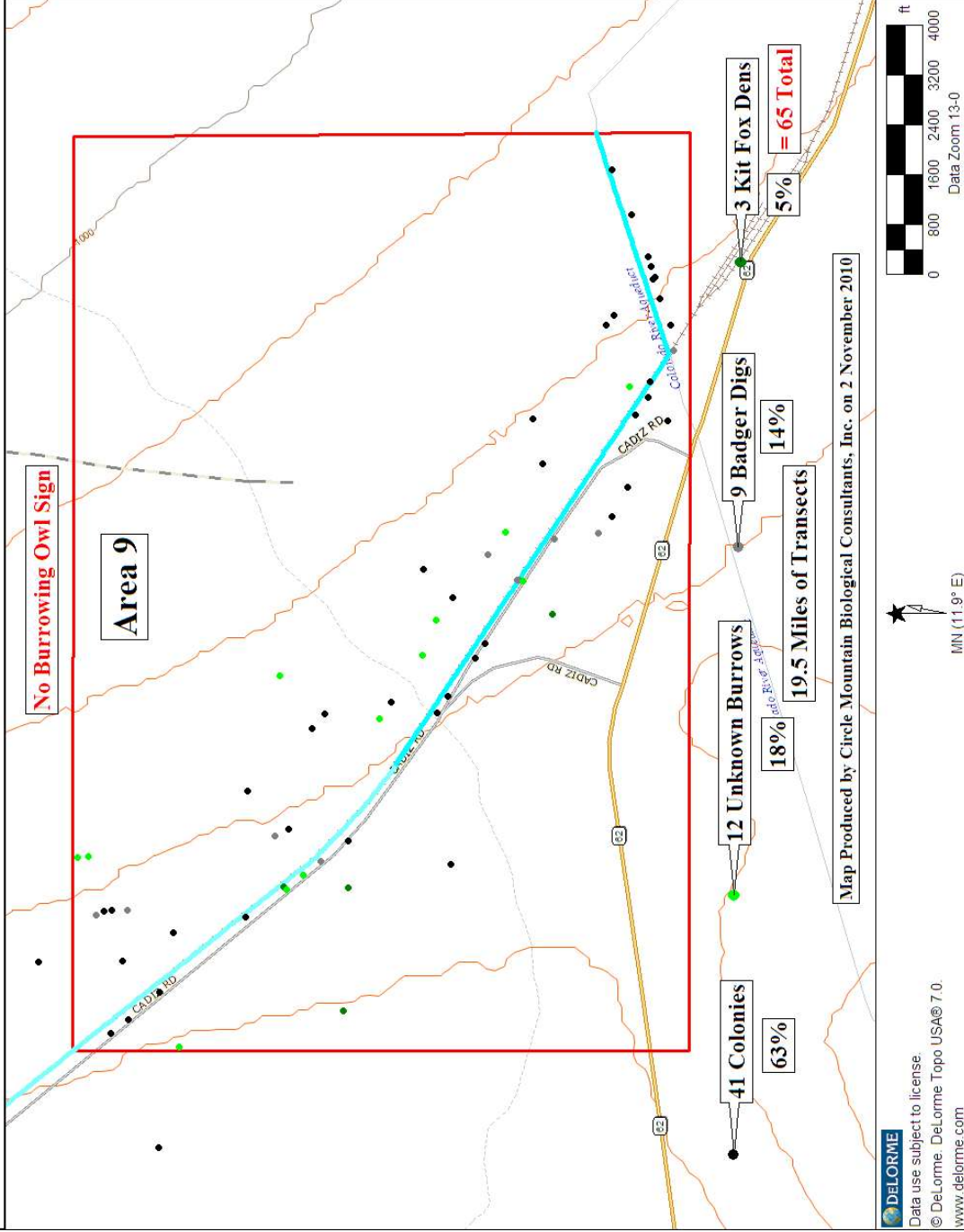


Figure D11. Burrowing Owl Data for All Wellfield Sections & Spreading Basin

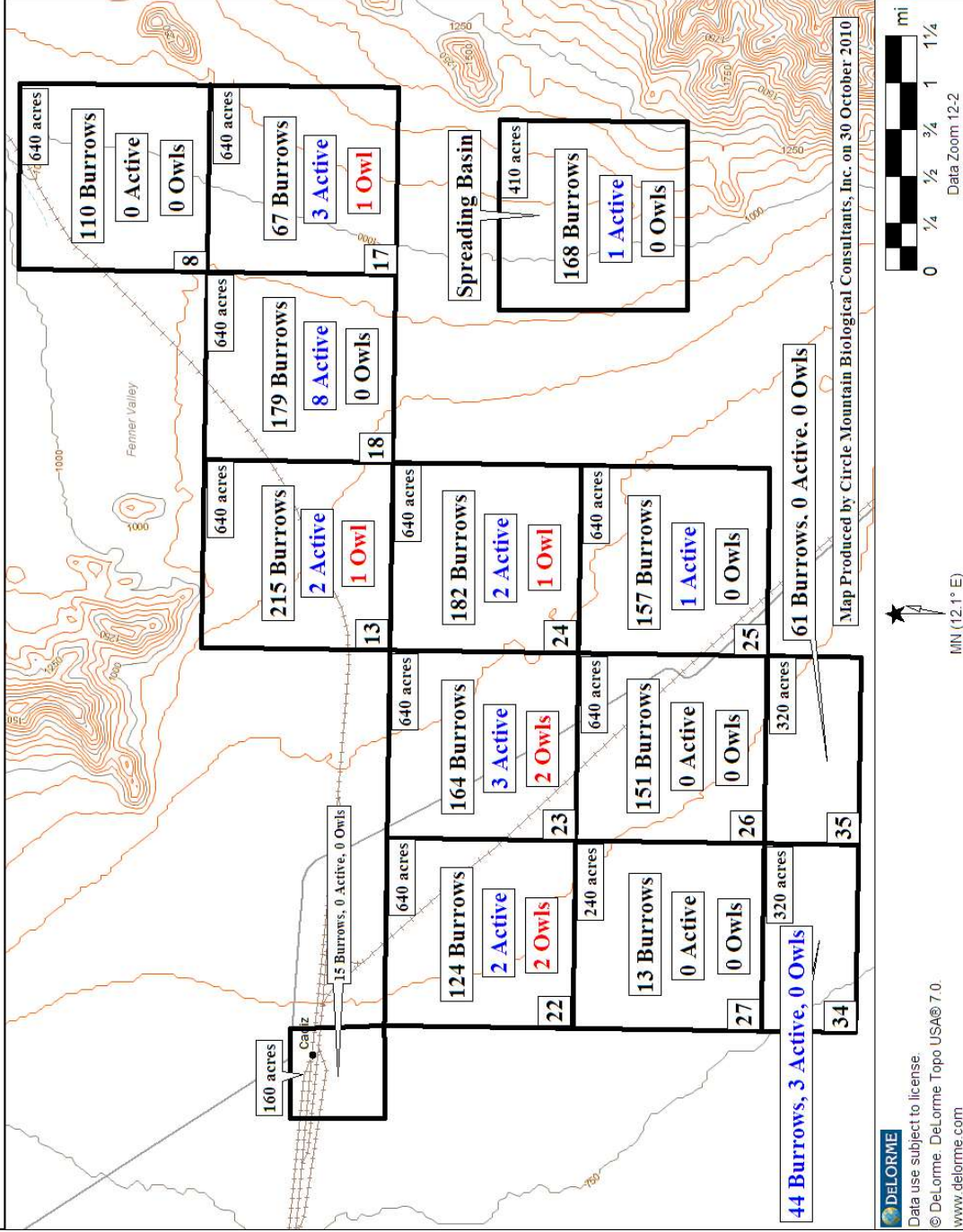


Figure D12. Burrow Data for Section 8 Wellfield Area

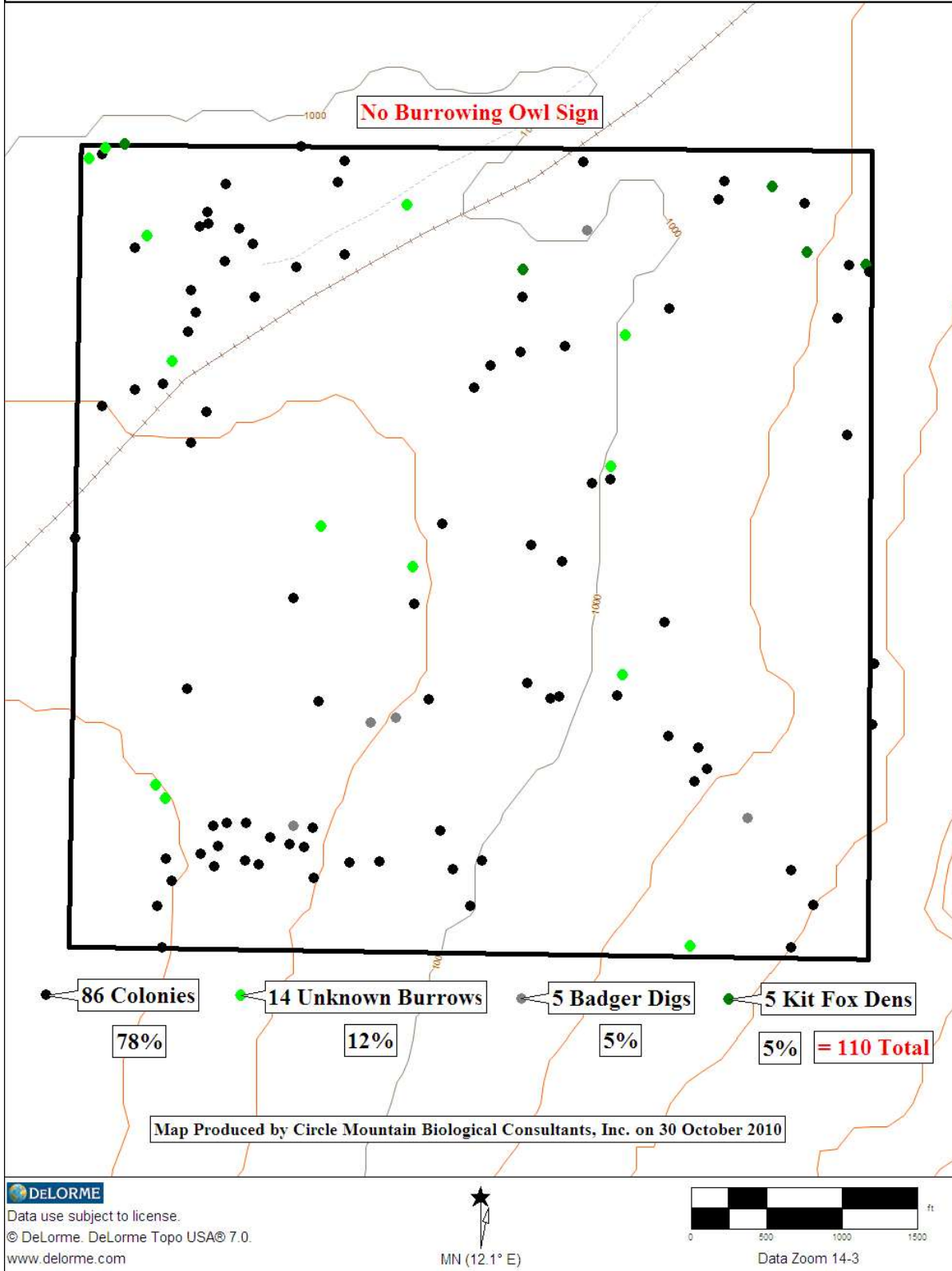


Figure D13. Burrow Data for Section 13 Wellfield Area

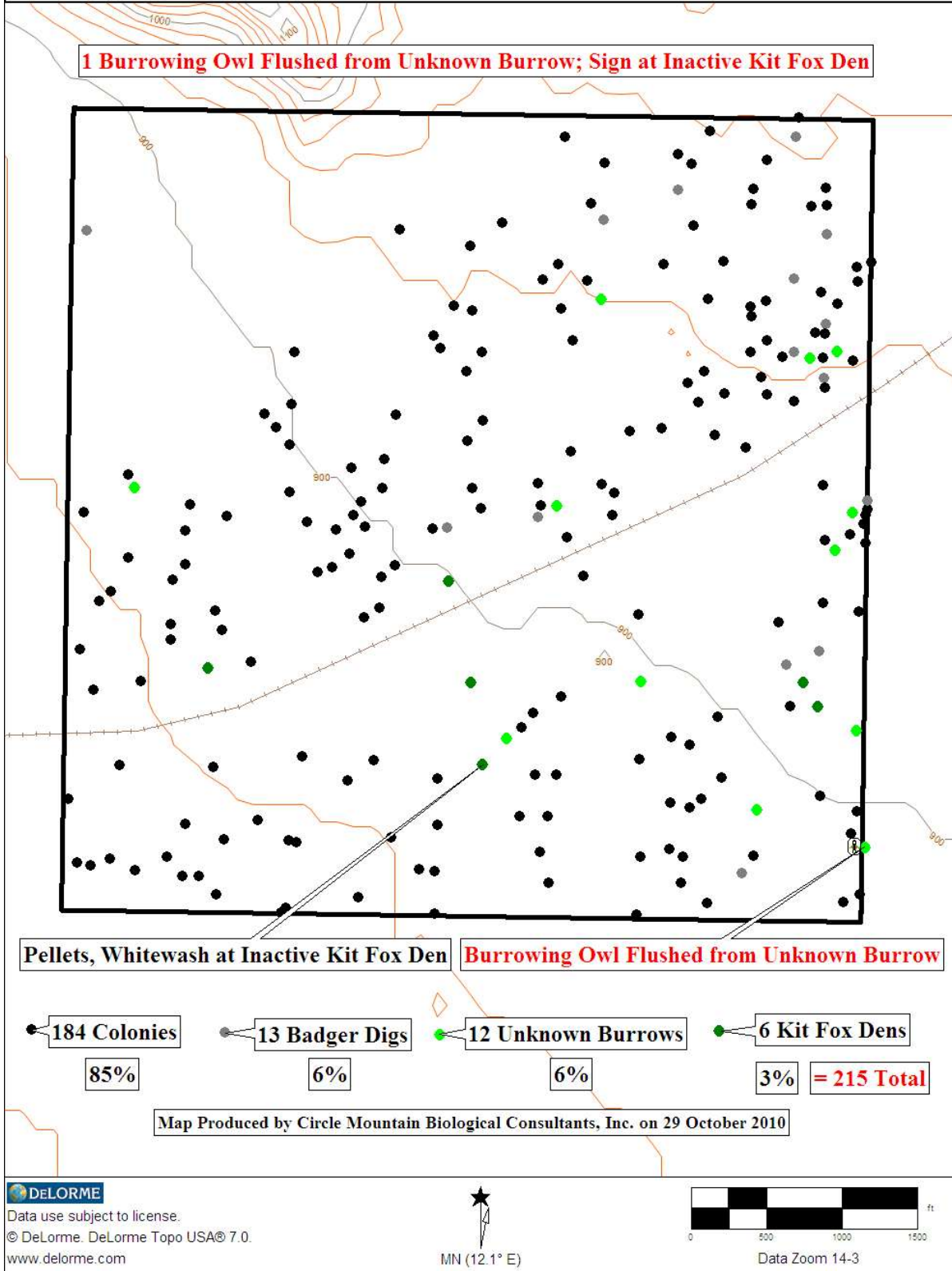


Figure D14. Burrow Data for Section 17 Wellfield Area

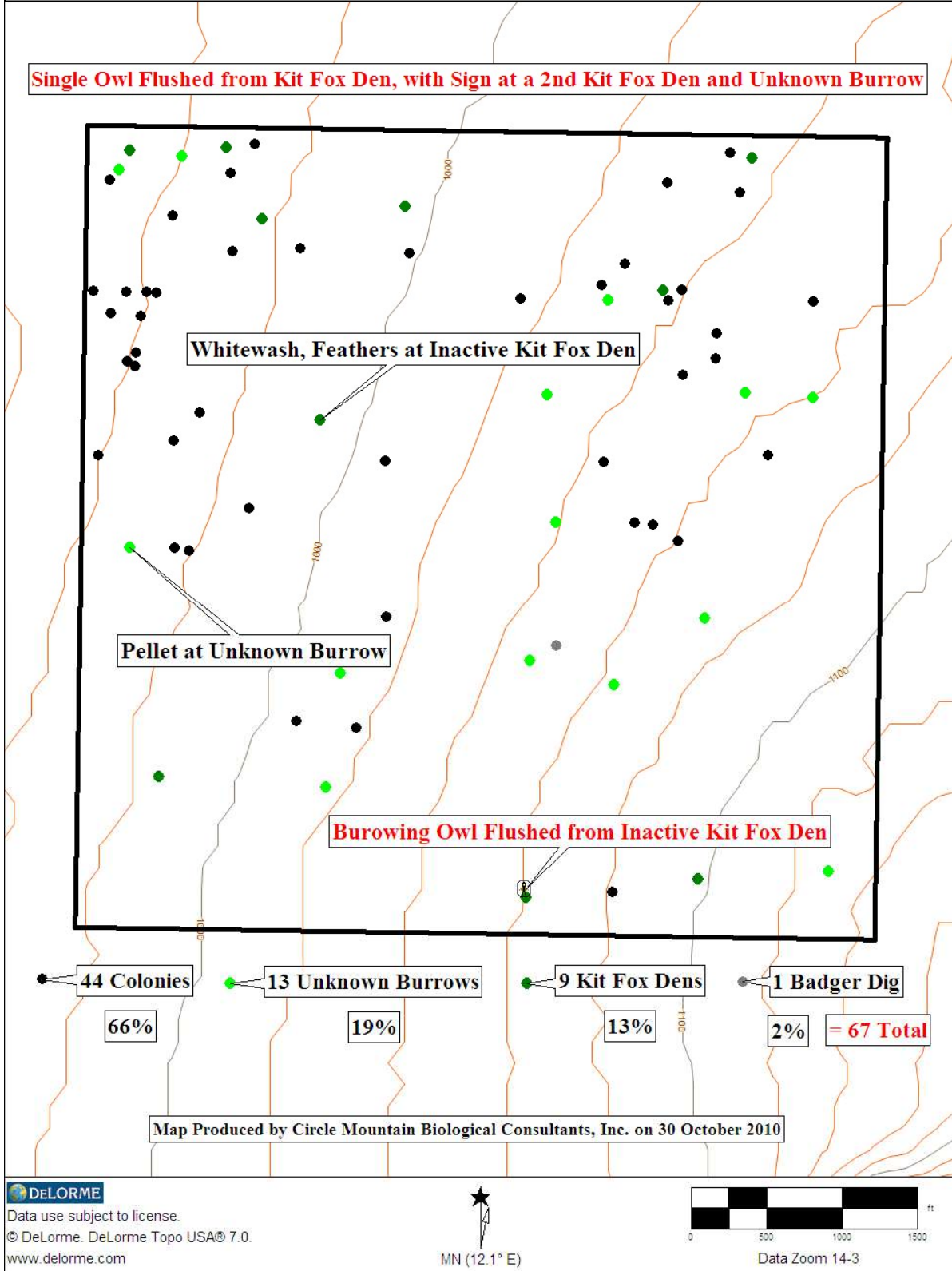


Figure D15. Burrow Data for Section 18 Wellfield Area

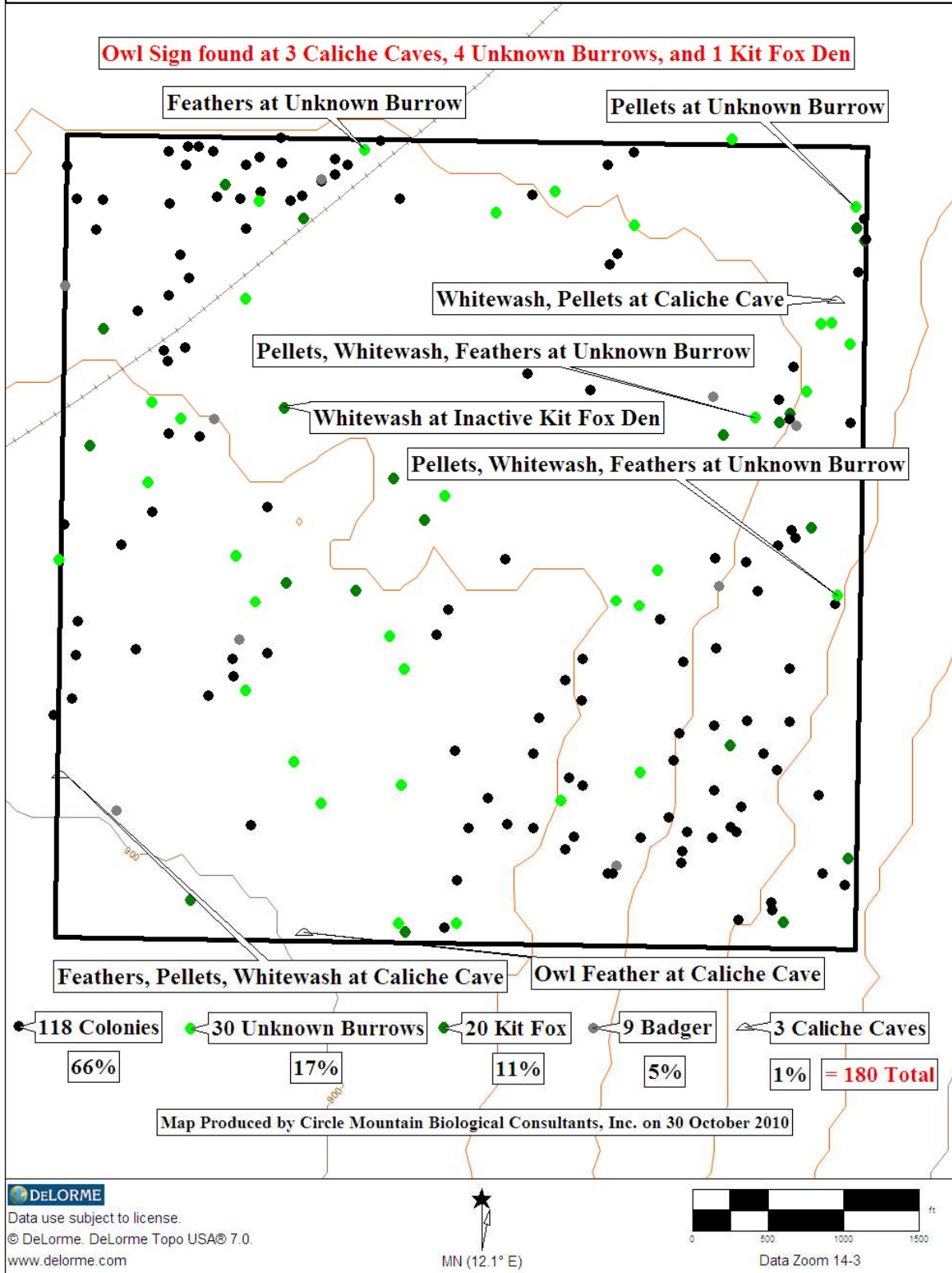


Figure D16. Burrow Data for Section 22 Wellfield Area

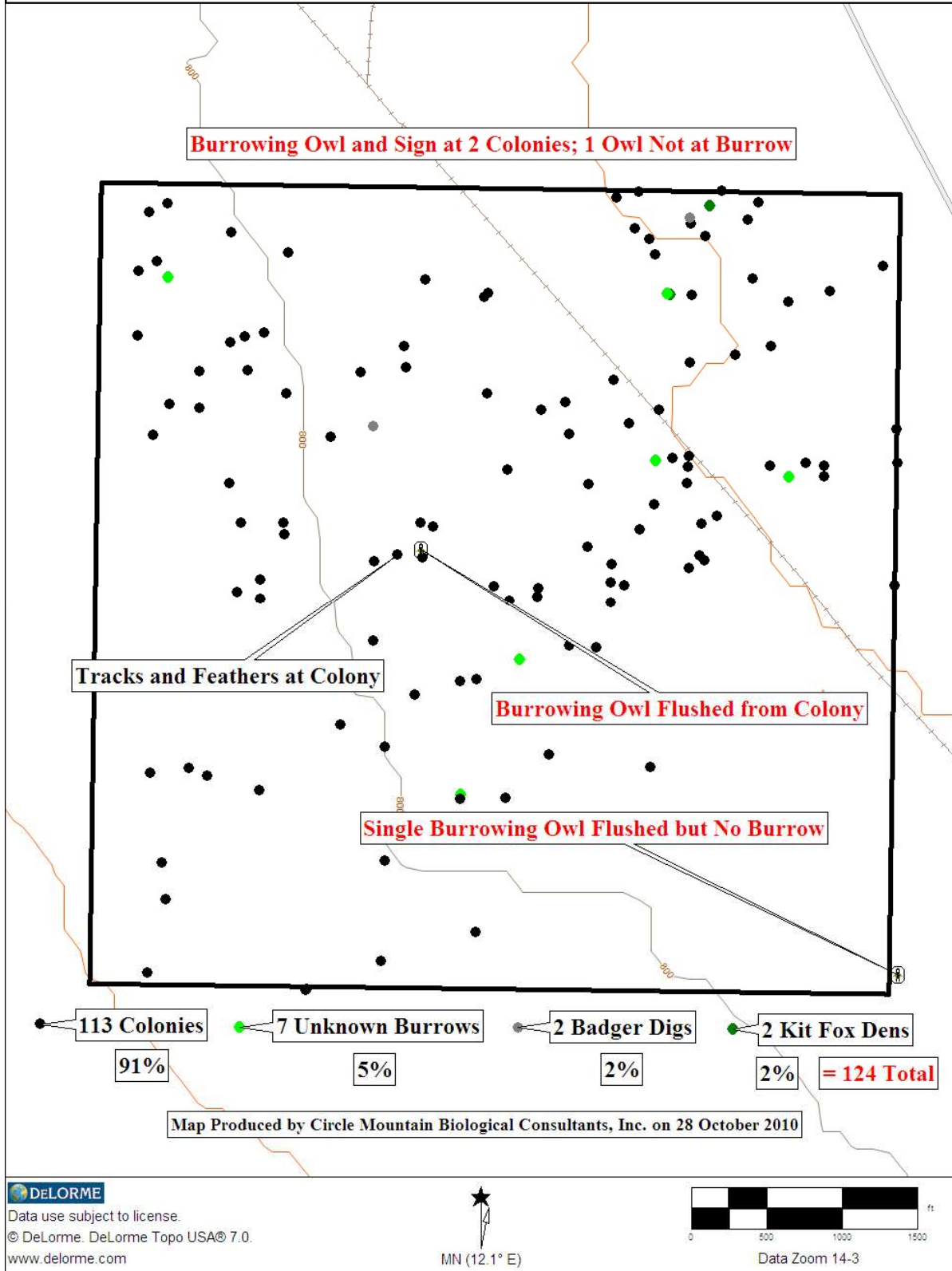


Figure D17. Burrow Data for Section 23 Wellfield Area

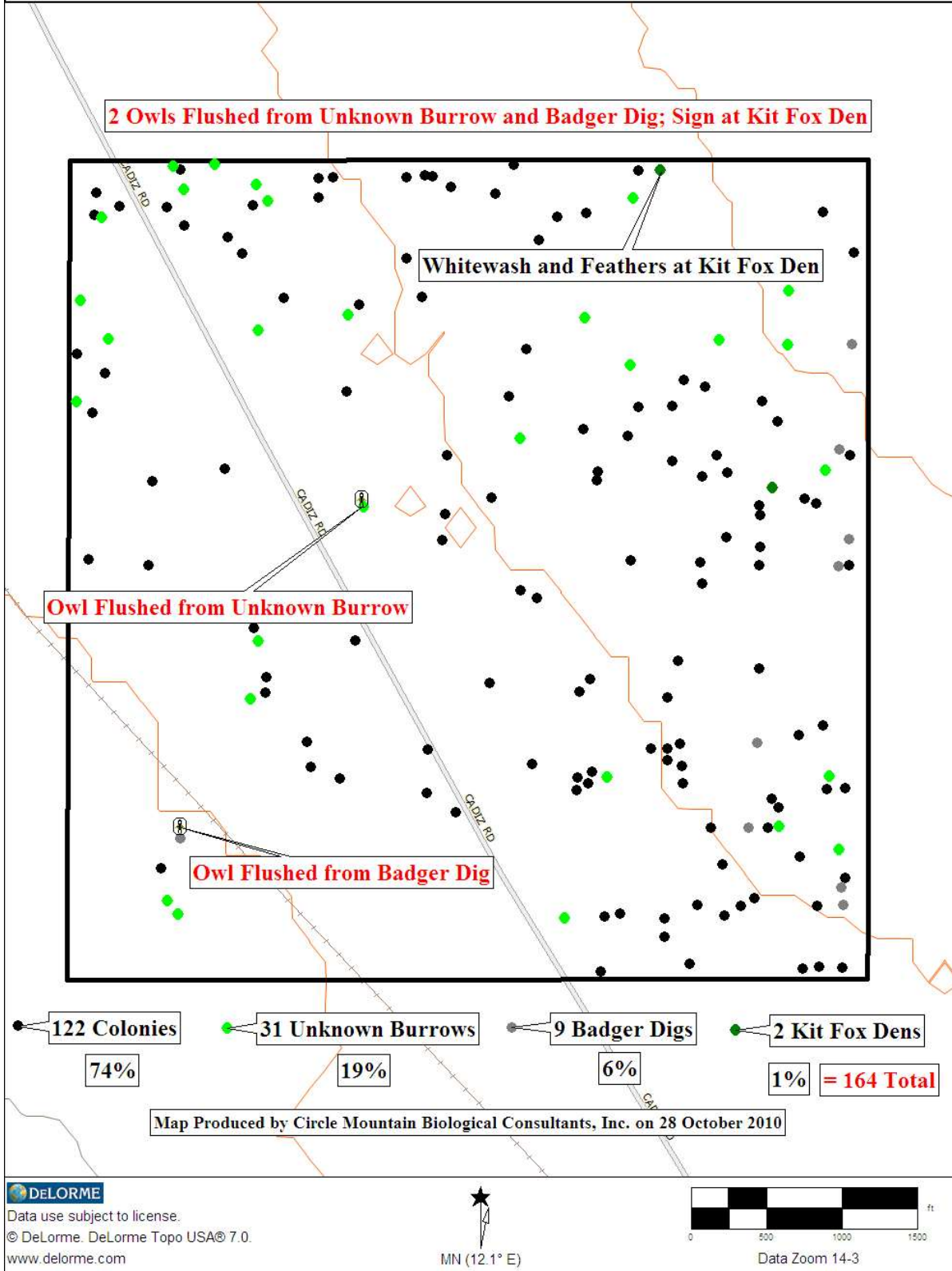


Figure D18. Burrow Data for Section 24 Wellfield Area

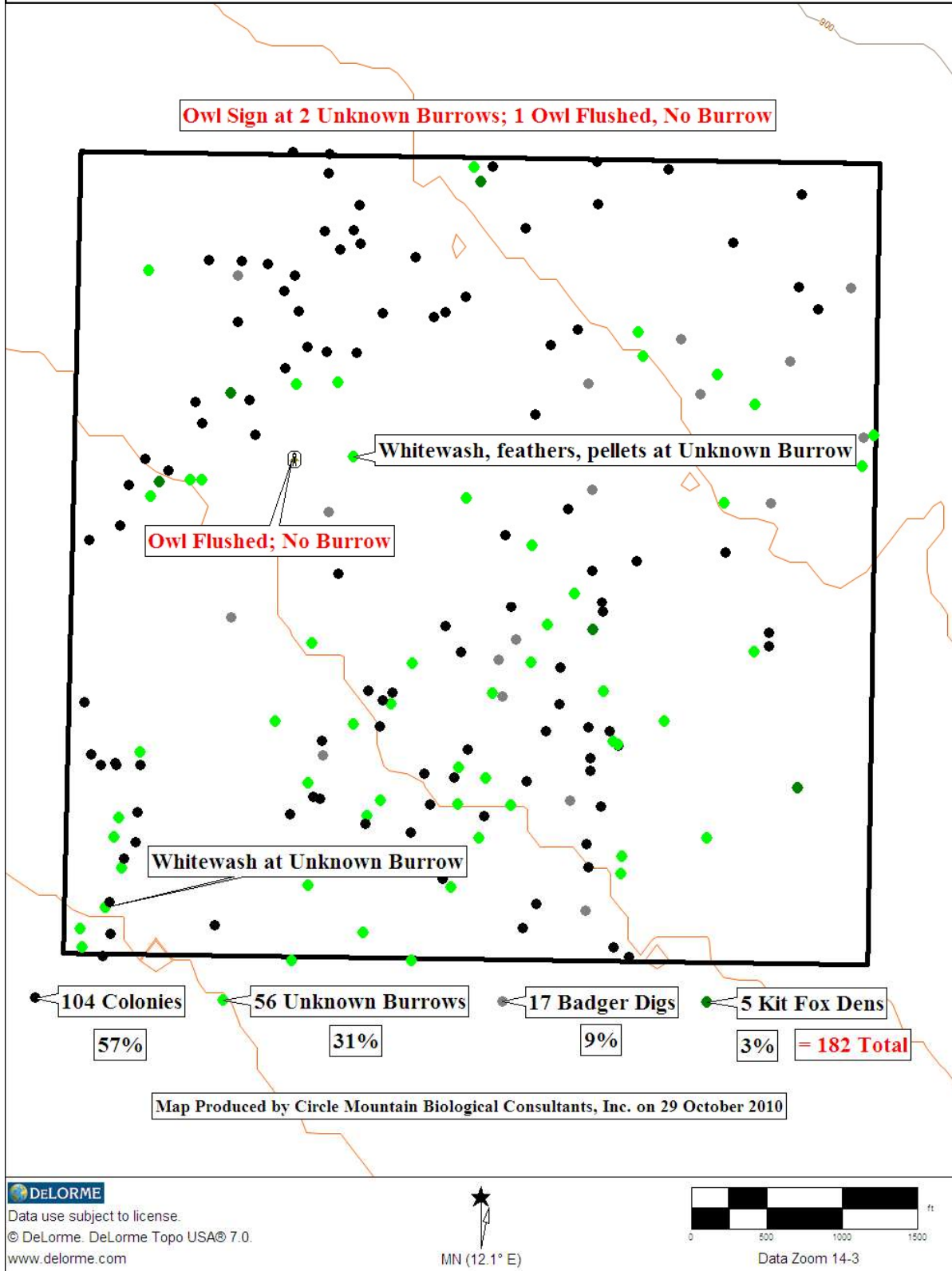


Figure D19. Burrow Data for Section 25 Wellfield Area

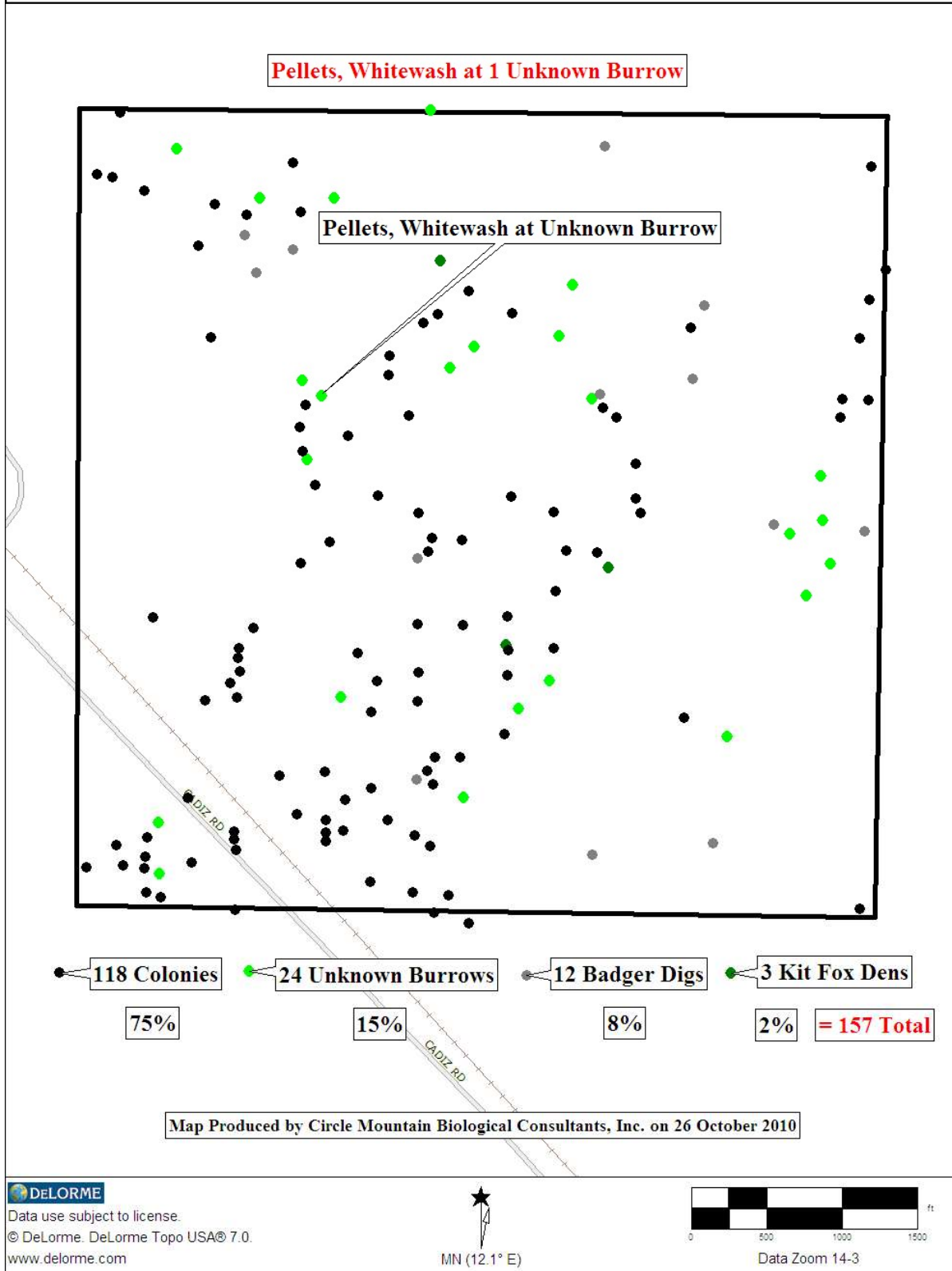


Figure D21. Burrow Data for Section 27 Wellfield Area

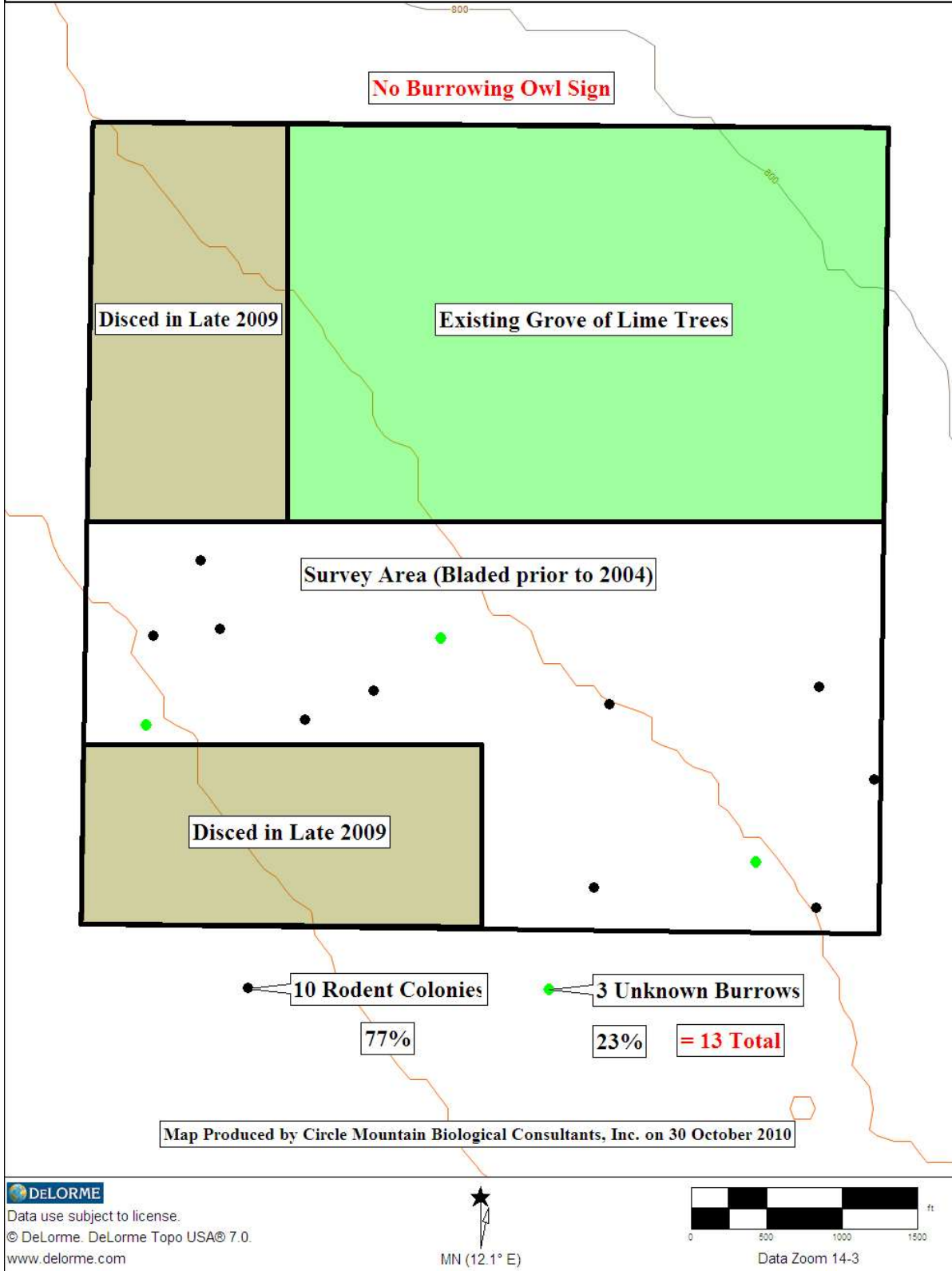


Figure D22. Burrow Data for Half-Section 34 Wellfield Area

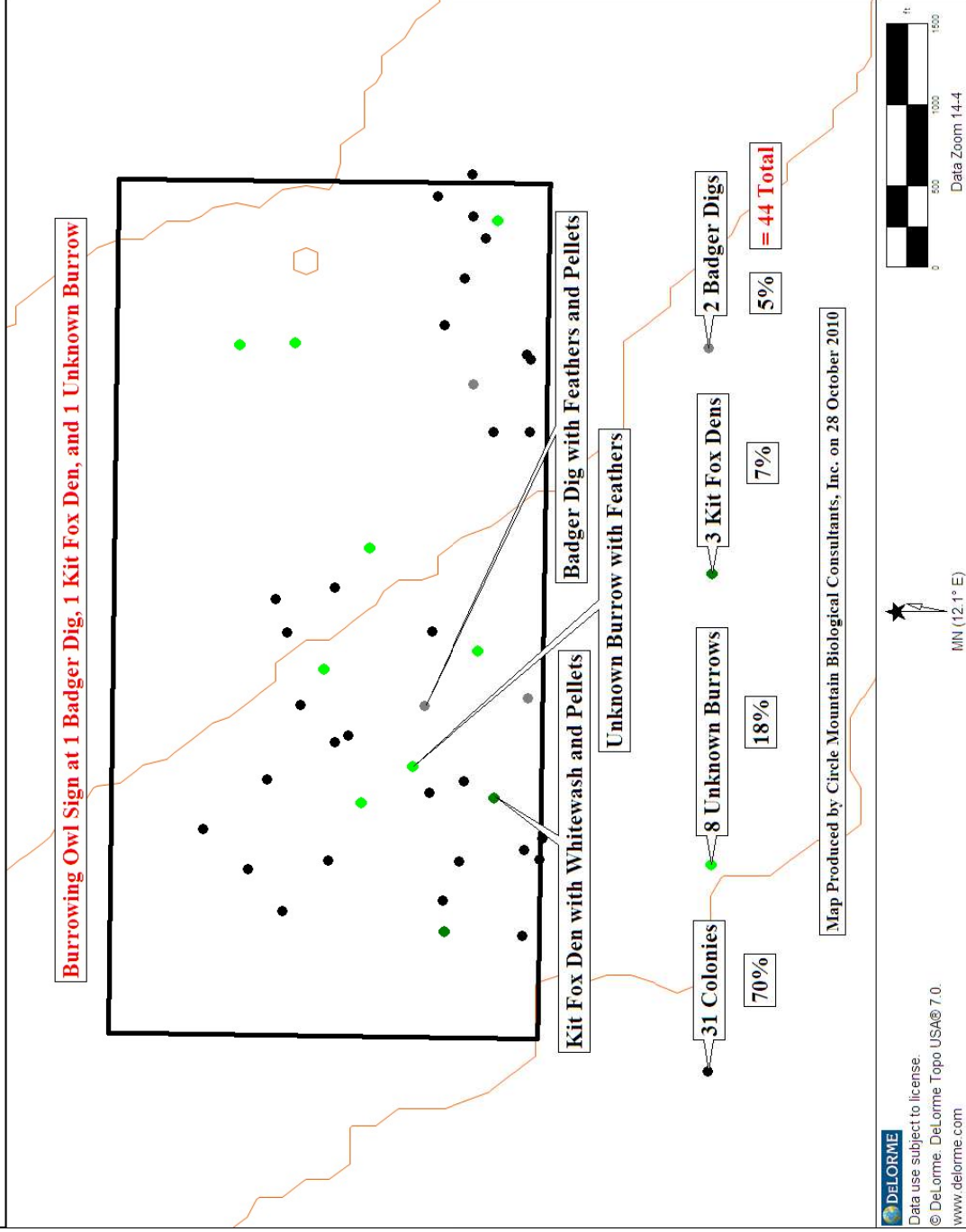


Figure D23. Burrow Data for Half-Section 35 Wellfield Area

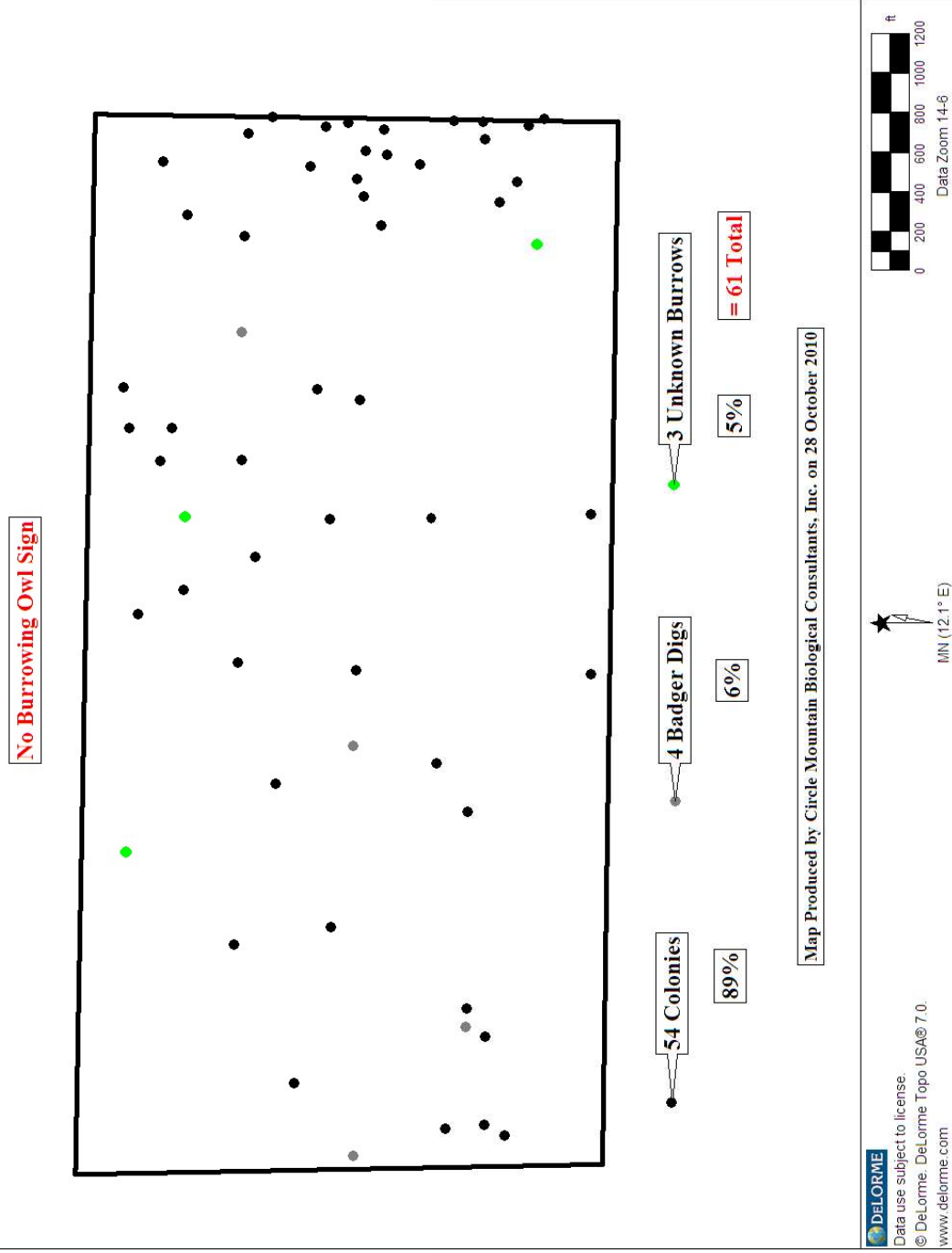


Figure D24. Burrow Data for 160-acre Wellfield Area

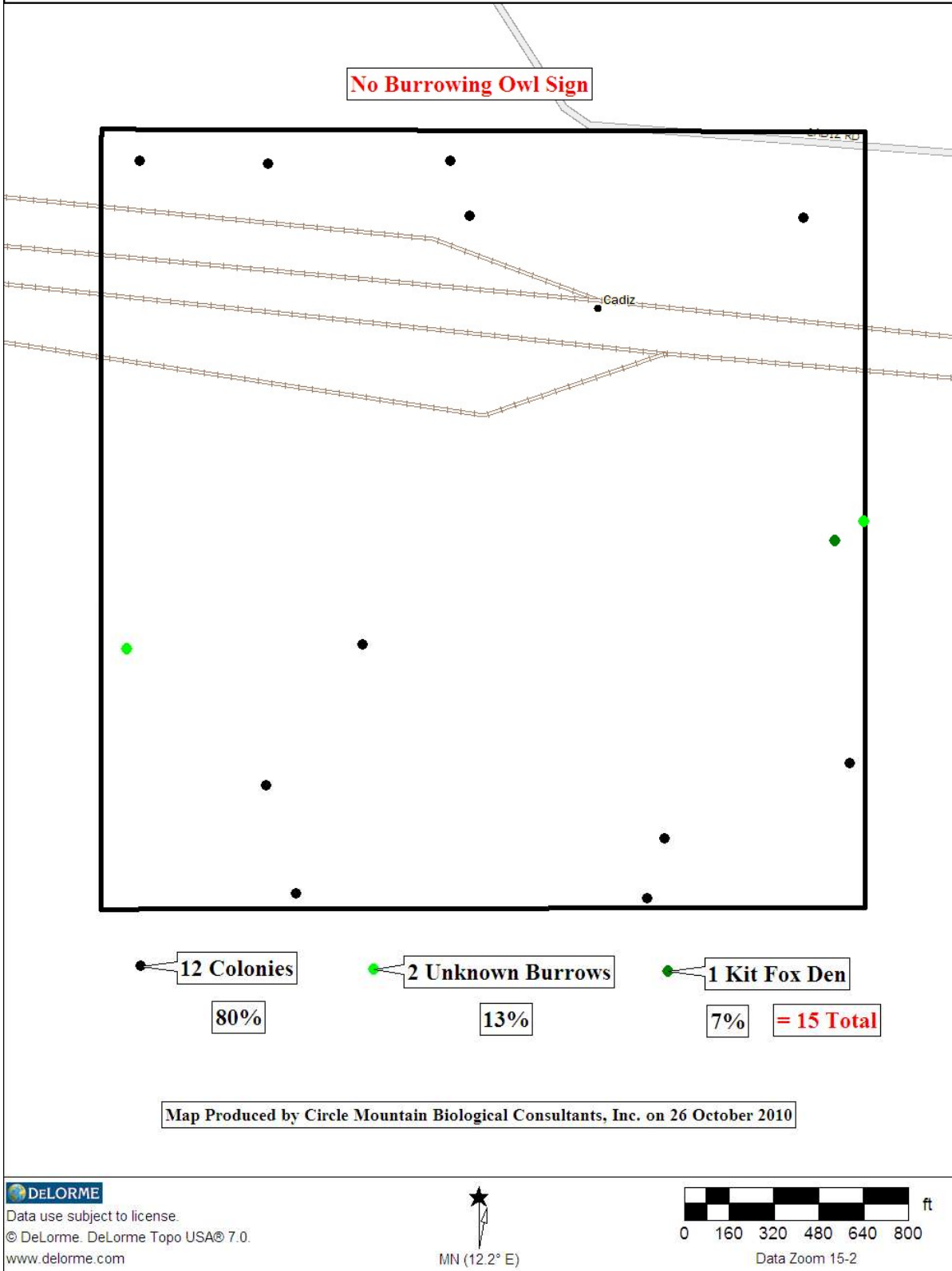
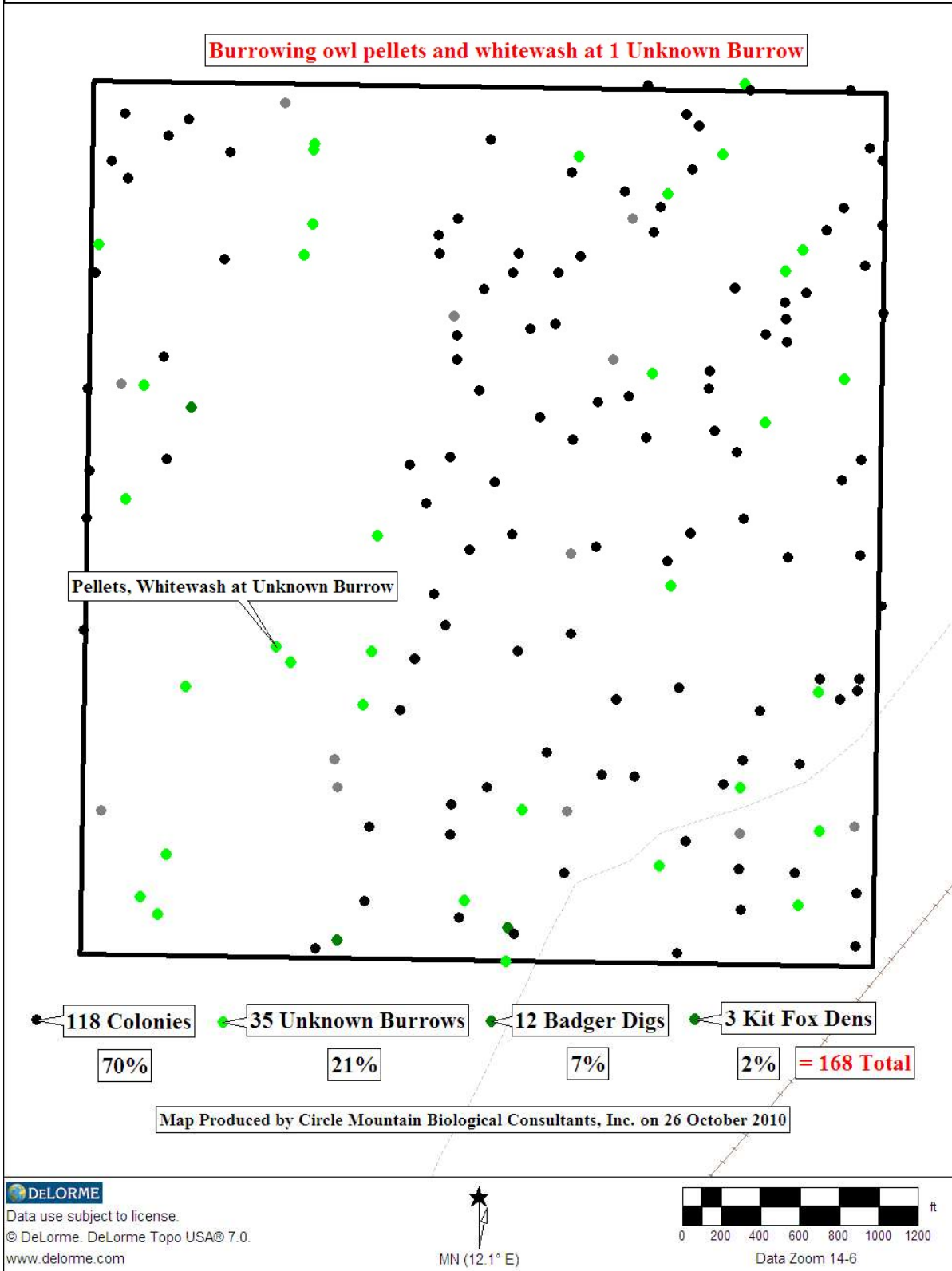
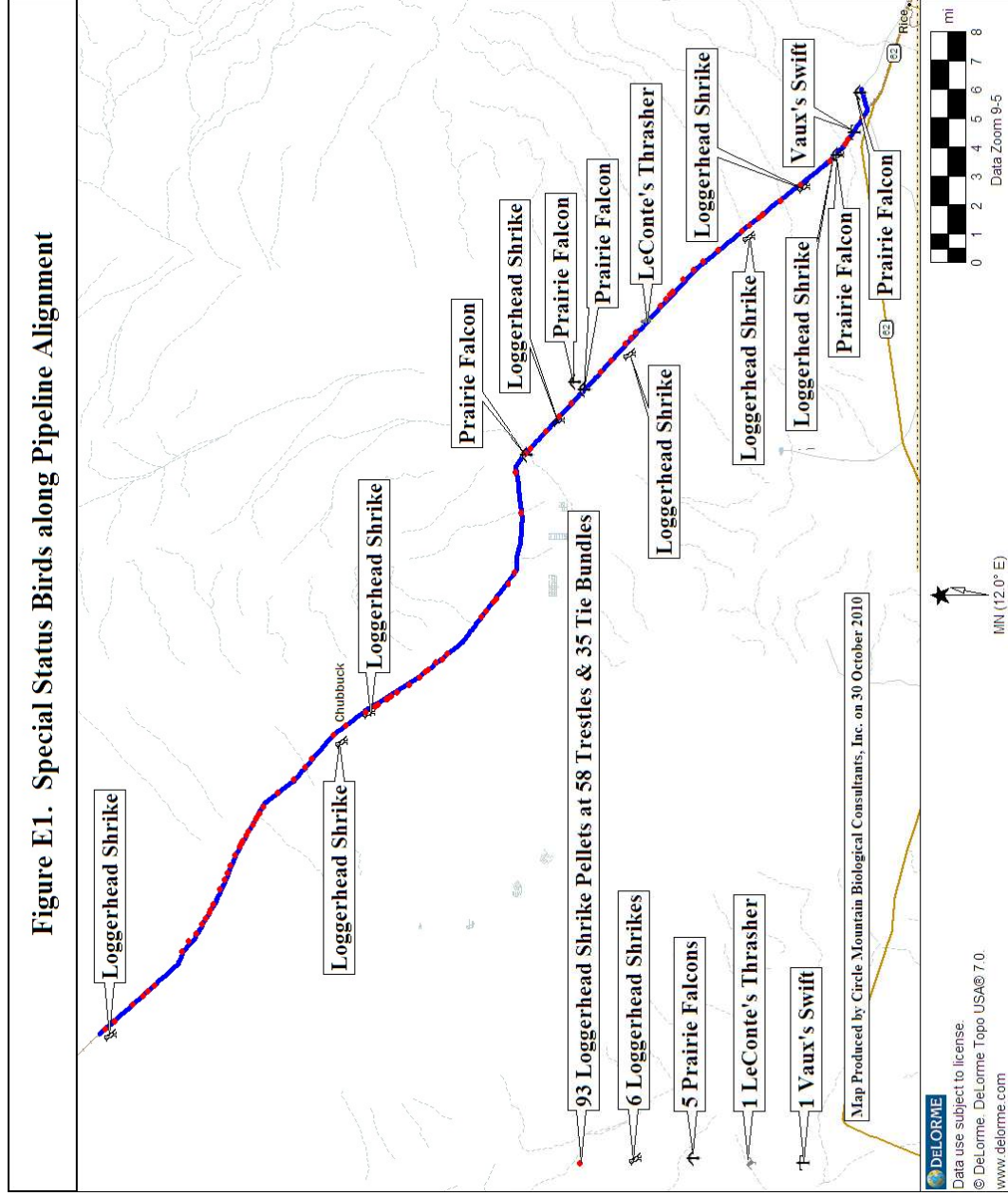
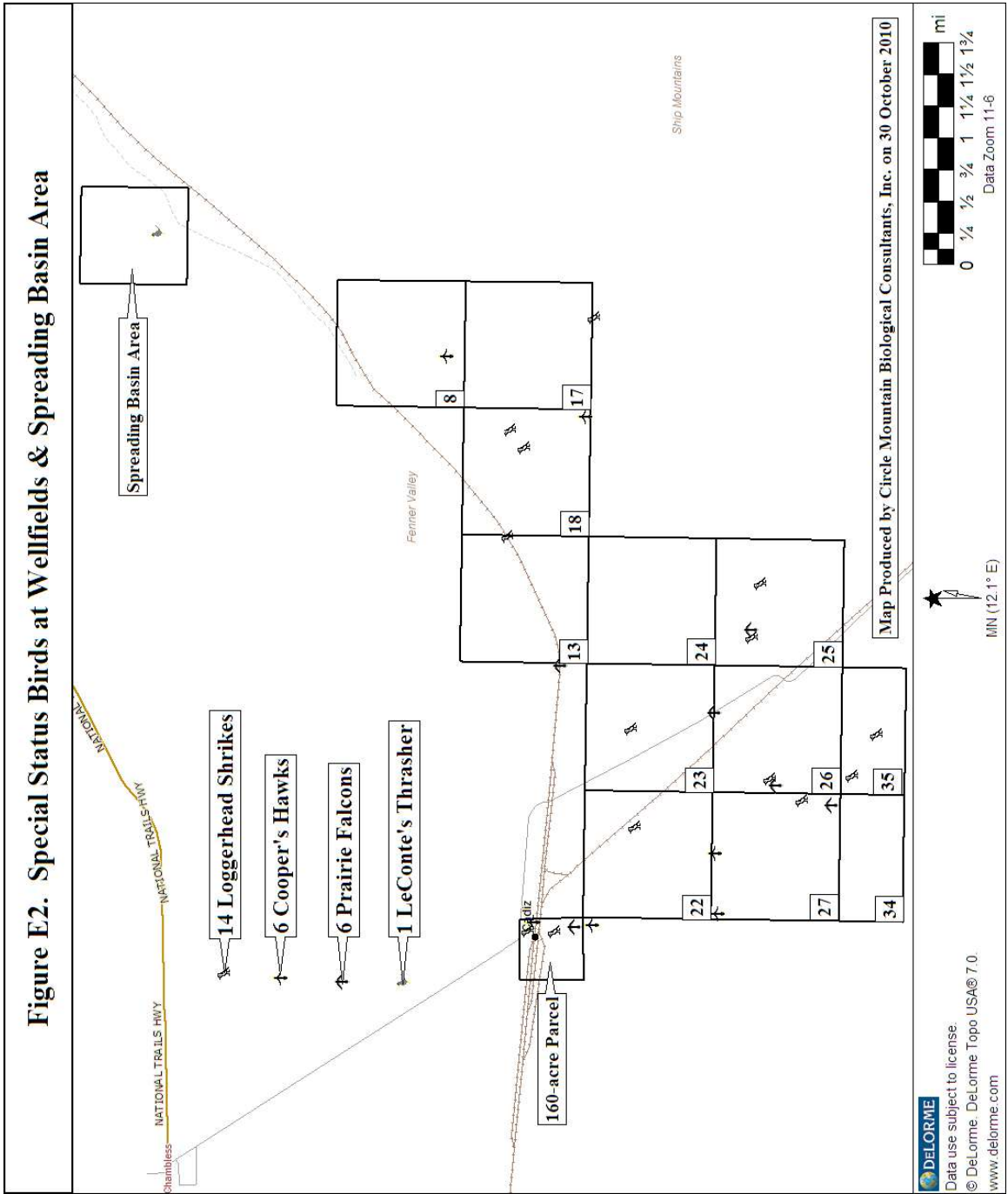


Figure D25. Burrow Data for Spreading Basin Area

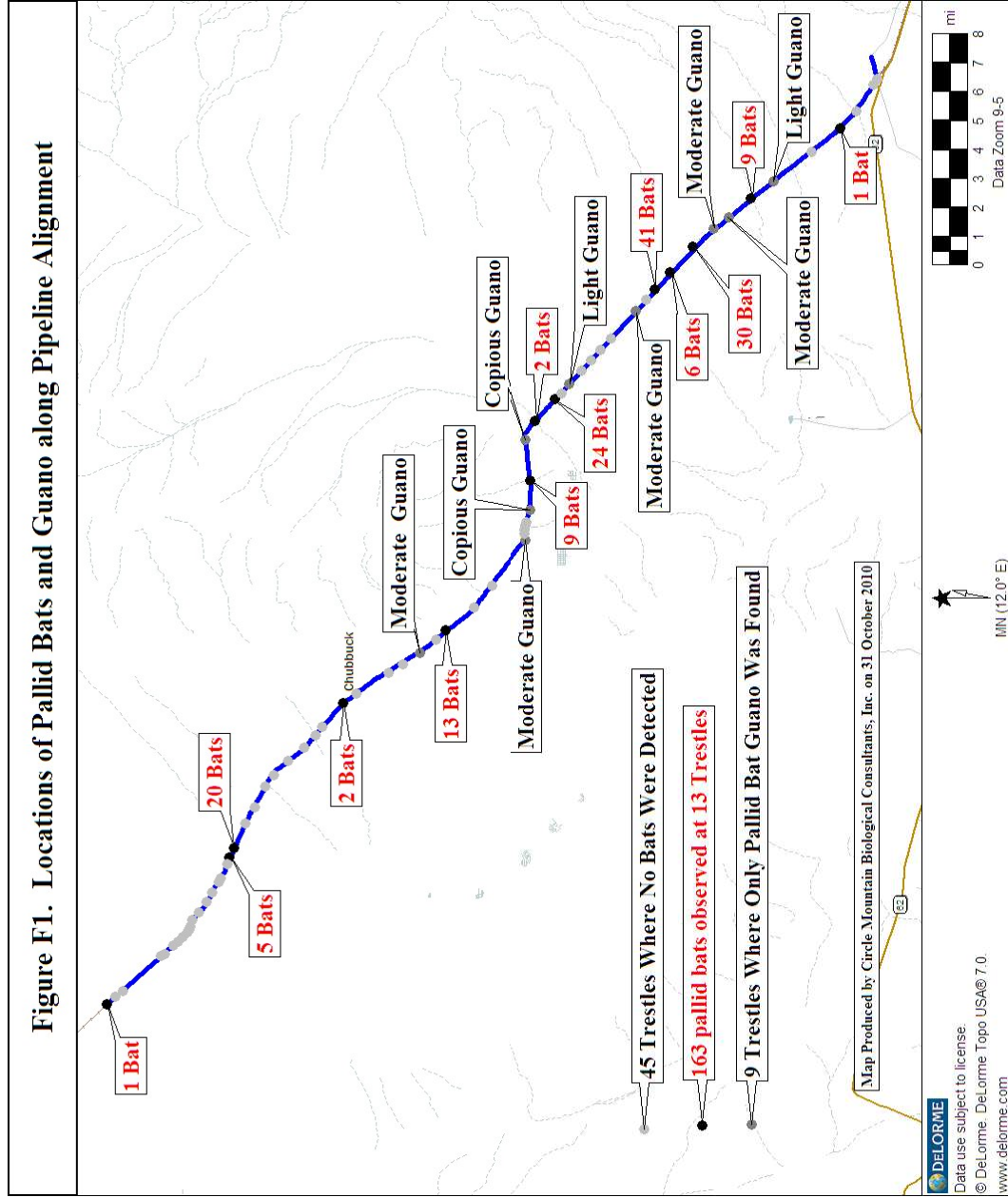


Appendix E. Locations of Other Special Status Bird Species

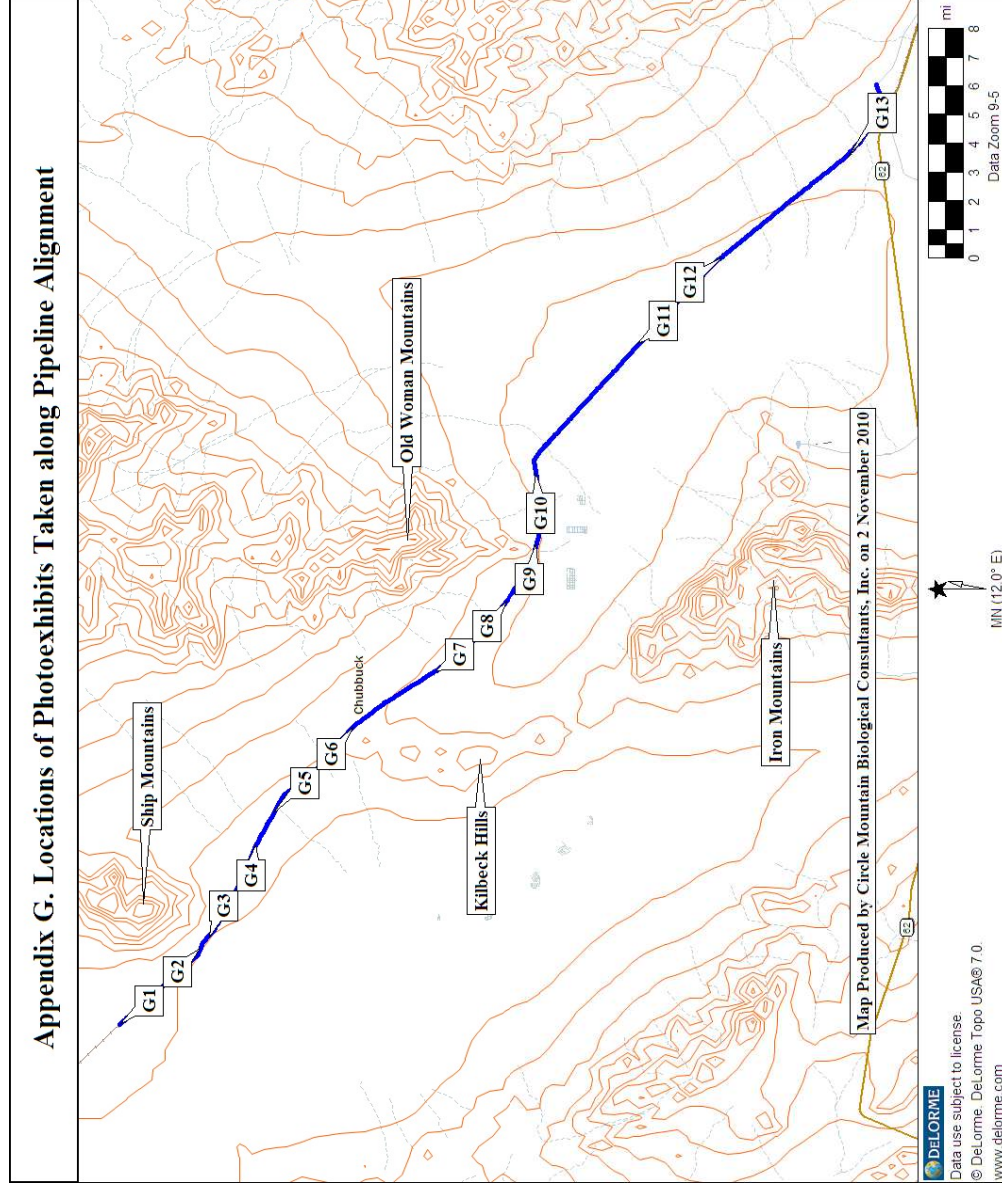




Appendix F. Locations of Pallid Bats and Sign



Appendix G. Photographic Exhibits along ARZC Right-Of-Way



Locations of the 13 photographic exhibits on the next 7 pages are depicted above.



Exhibit G1. View along ARZC ROW, facing north towards Cadiz.



Exhibit G2. View from same location as G1, facing south towards Ship Mountains.



Exhibit G3. View along ARZC ROW, facing north towards Ship Mountains.

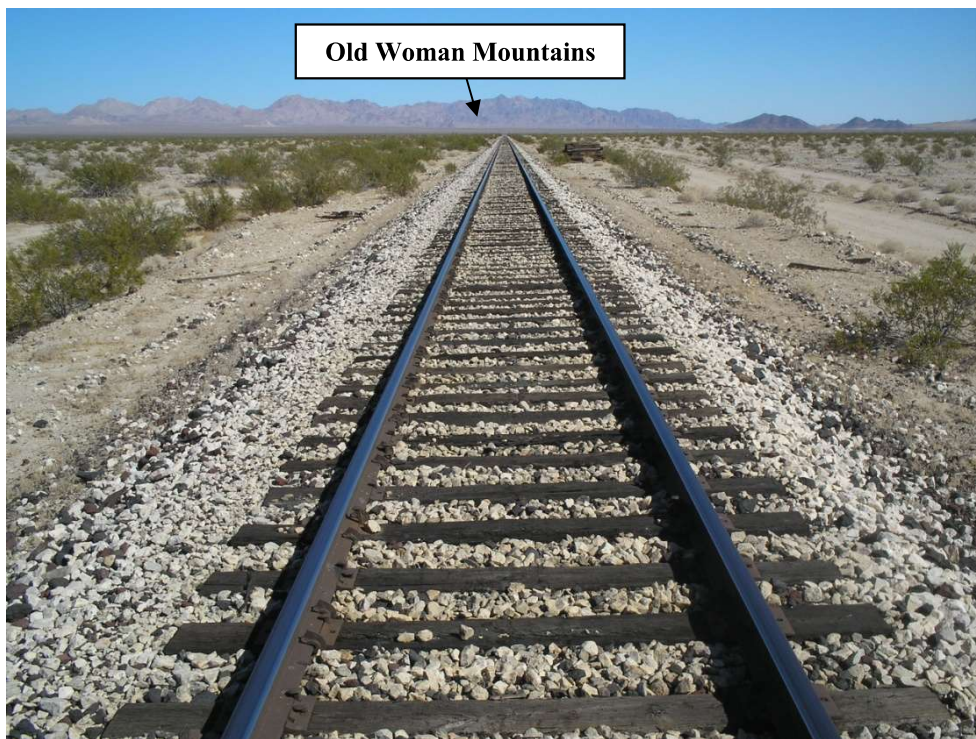


Exhibit G4. View from same location as G3, facing south towards Old Woman Mountains.

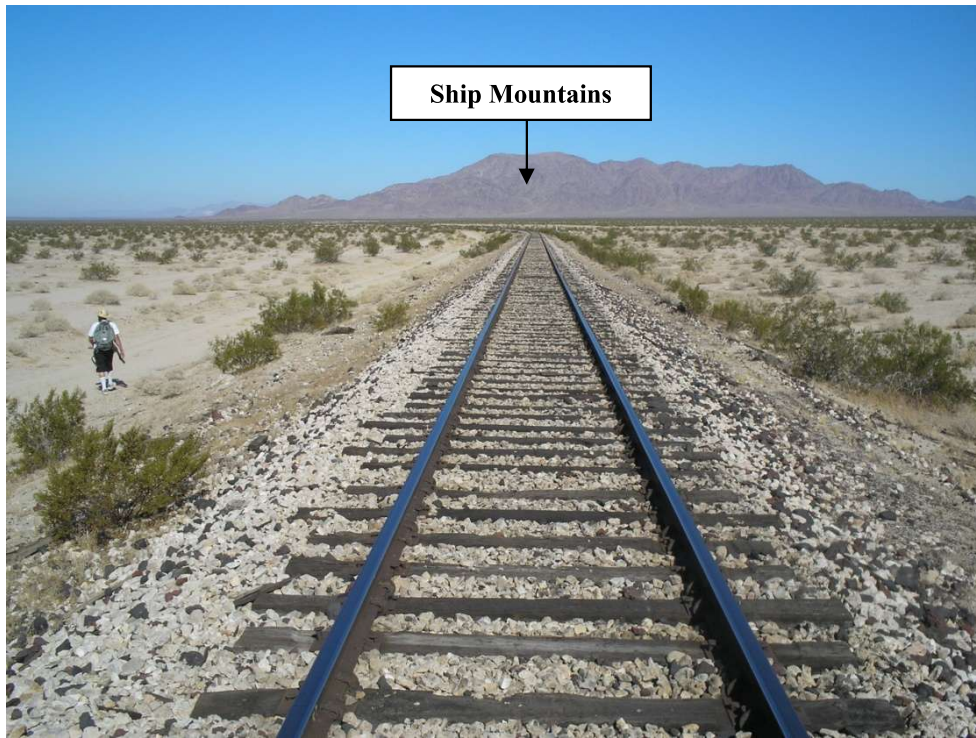


Exhibit G5. View along ARZC ROW, facing north towards Ship Mountains.

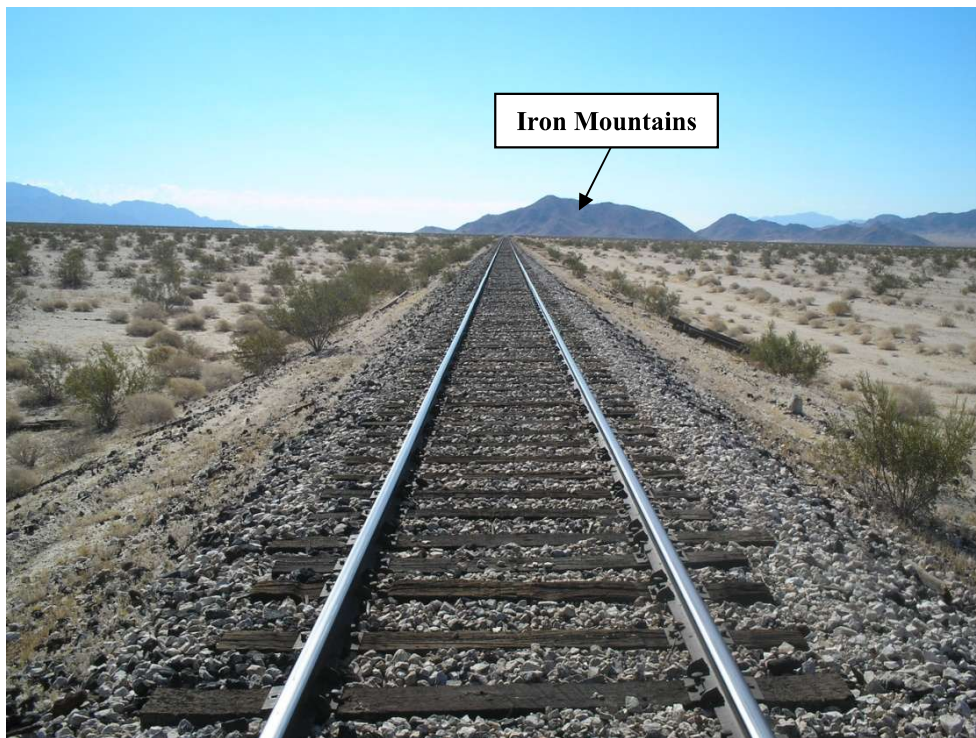


Exhibit G6. View from same location as G5, facing south towards Iron Mountains.



Exhibit G7. View along ARZC ROW, facing north towards Kilbeck Hills.

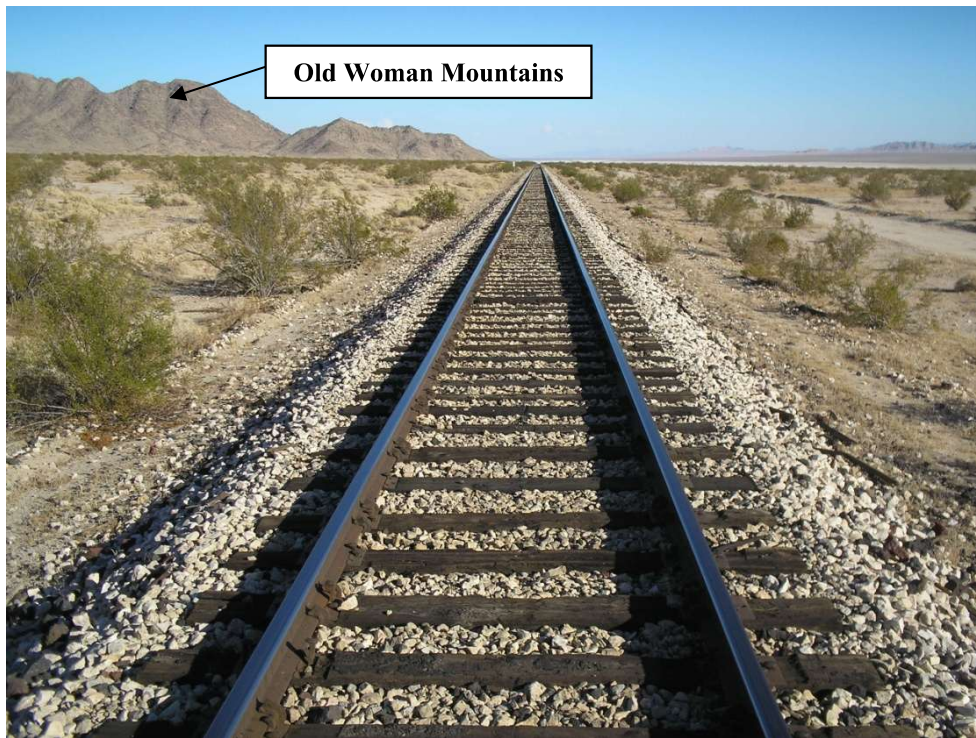


Exhibit G8. View from same location as G7, facing south towards Old Woman Mountains.



Exhibit G9. View along ARZC ROW at tip of Old Woman Mountains, facing south.



Exhibit G10. View of some of the buildings at the historic site of Milligan, facing east.



Exhibit G11. View along ARZC ROW, facing north towards Old Woman Mountains.



Exhibit G12. View from same location as G11, facing southeast.

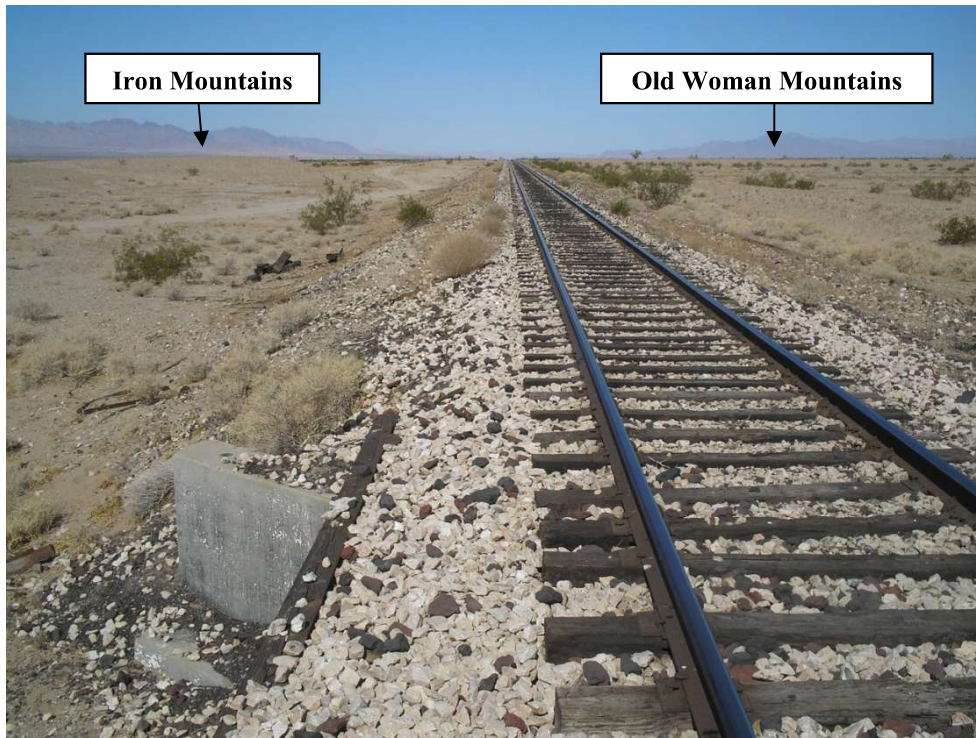
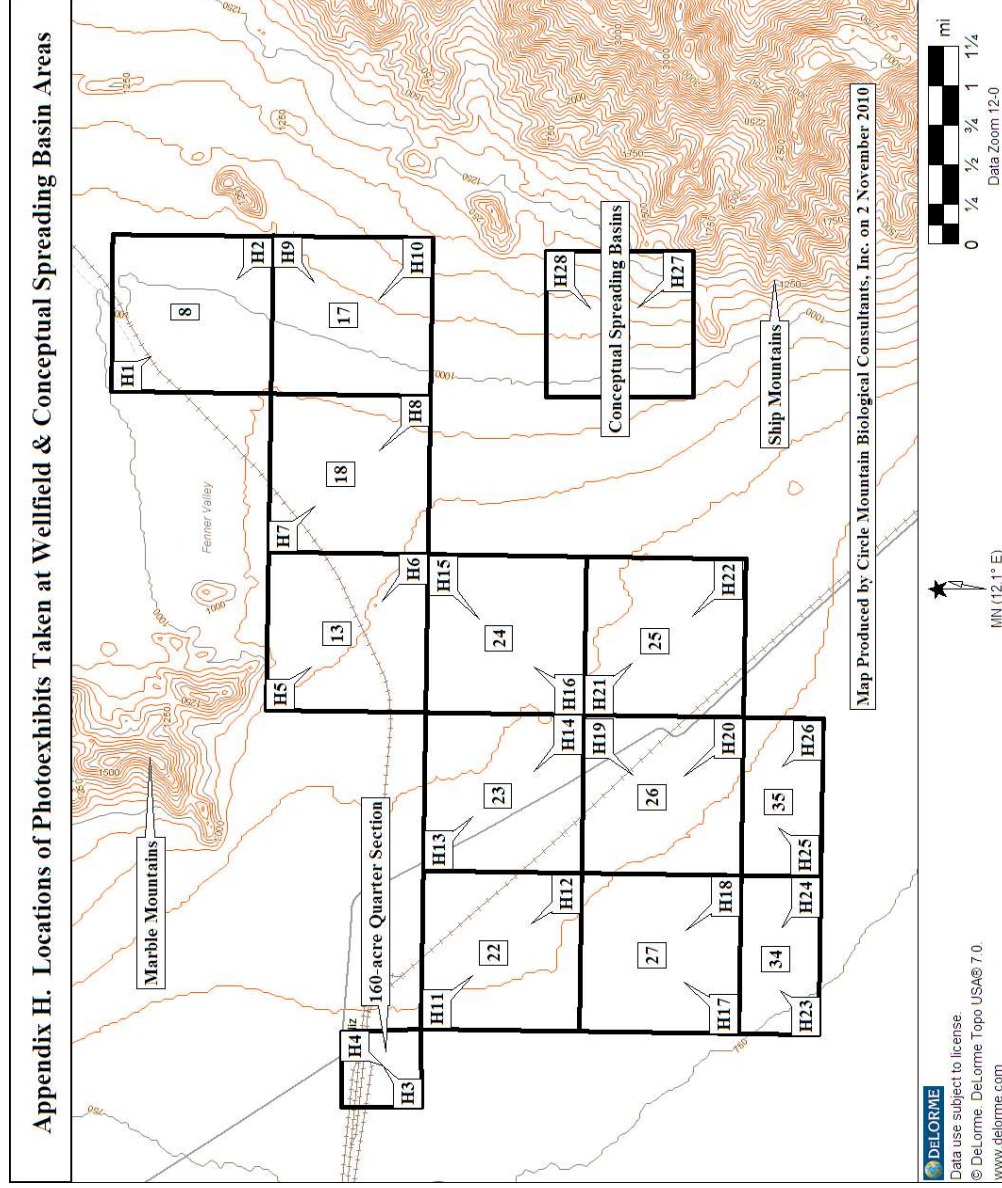


Exhibit G13. View from the southern terminus of the ARZC ROW, facing north.

Appendix H. Photographic Exhibits within Wellfield and Conceptual Spreading Basins Areas



Locations of the 28 photographic exhibits on the next 14 pages are depicted above.



Exhibit H1. Section 8 Wellfield: View from northwest corner of Section 8, facing southeast.



Exhibit H2. Section 8 Wellfield: View from southeast corner of Section 8, facing northwest.



Exhibit H3. 160-acre Wellfield: View from southwest corner, facing northeast.



Exhibit H4. 160-acre Wellfield: View from northeast corner, facing southwest.



Exhibit H5. Section 13 Wellfield: View from northwest corner of Section 13, facing southeast.



Exhibit H6. Section 13 Wellfield: View from southeast corner of Section 13, facing northwest.

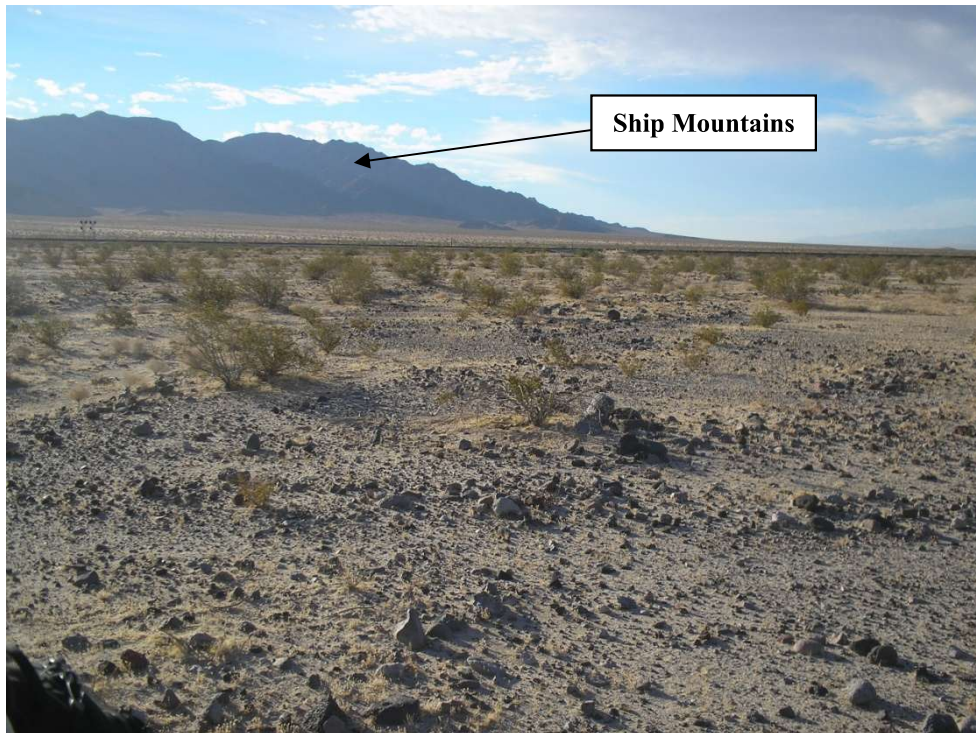


Exhibit H7. Section 18 Wellfield: View from northwest corner of Section 18, facing southeast.

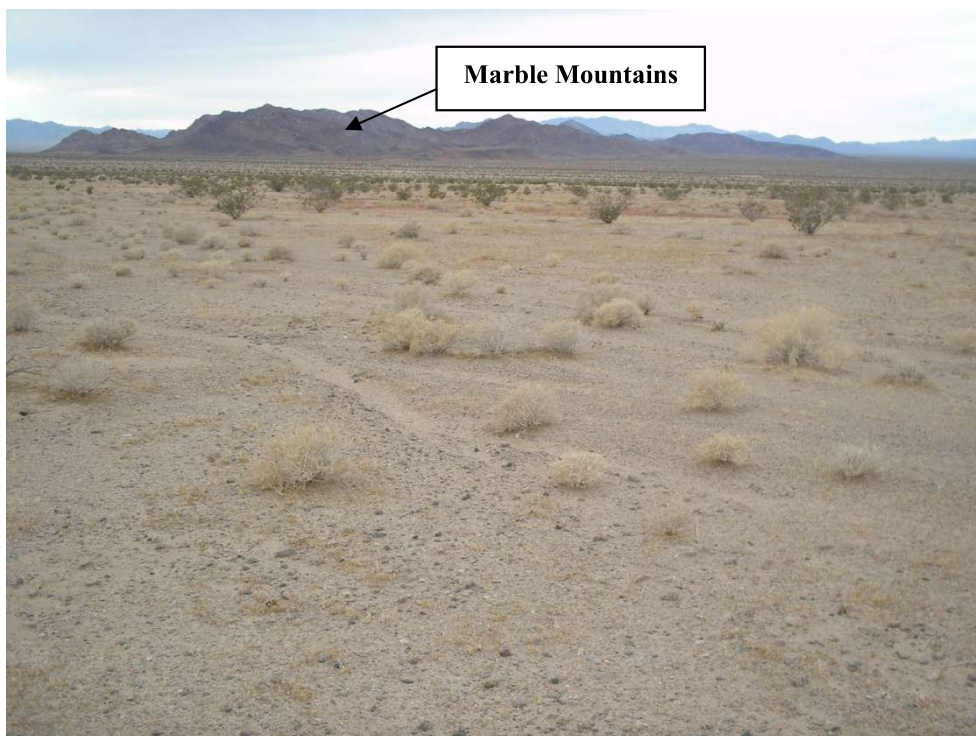


Exhibit H8. Section 18 Wellfield: View from southeast corner of Section 18, facing northwest.



Exhibit H9. Section 17 Wellfield: View from northeast corner of Section 17, facing southwest.

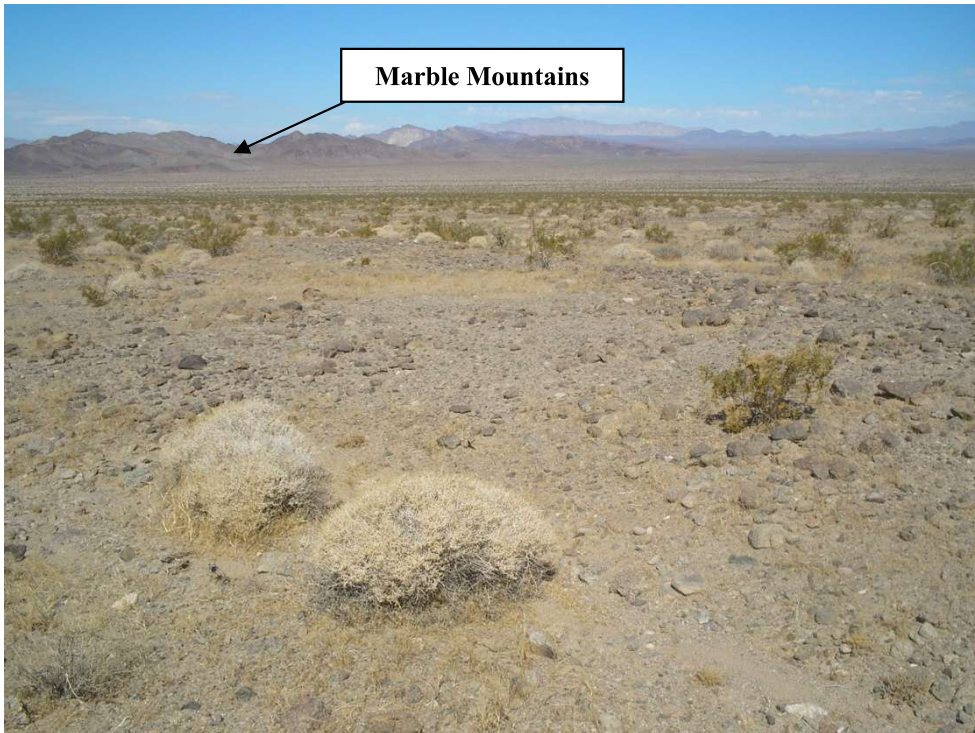


Exhibit H10. Section 17 Wellfield: View from northeast corner of Section 17, facing southwest.

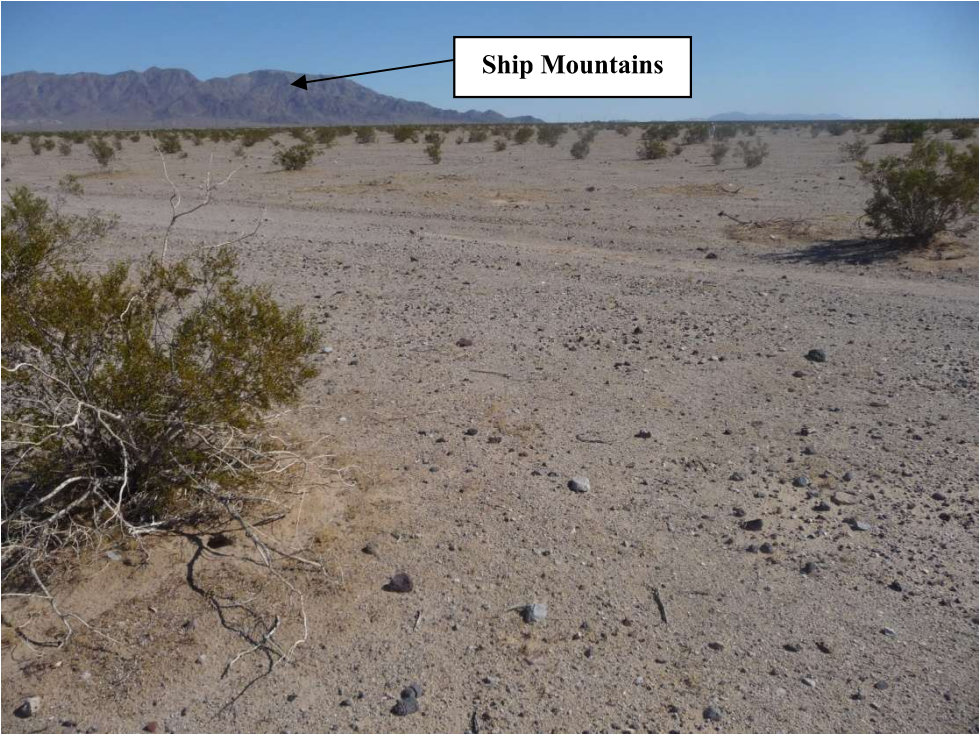


Exhibit H11. Section 22 Wellfield: View from northwest corner of Section 22, facing southeast.

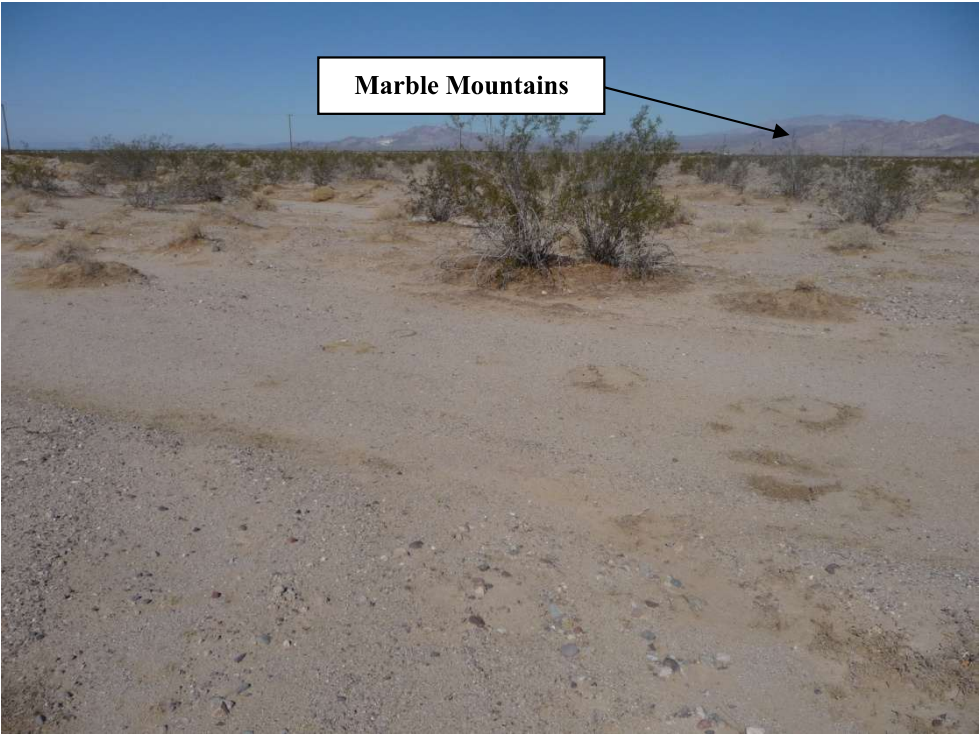


Exhibit H12. Section 22 Wellfield: View from southeast corner of Section 22, facing northwest.

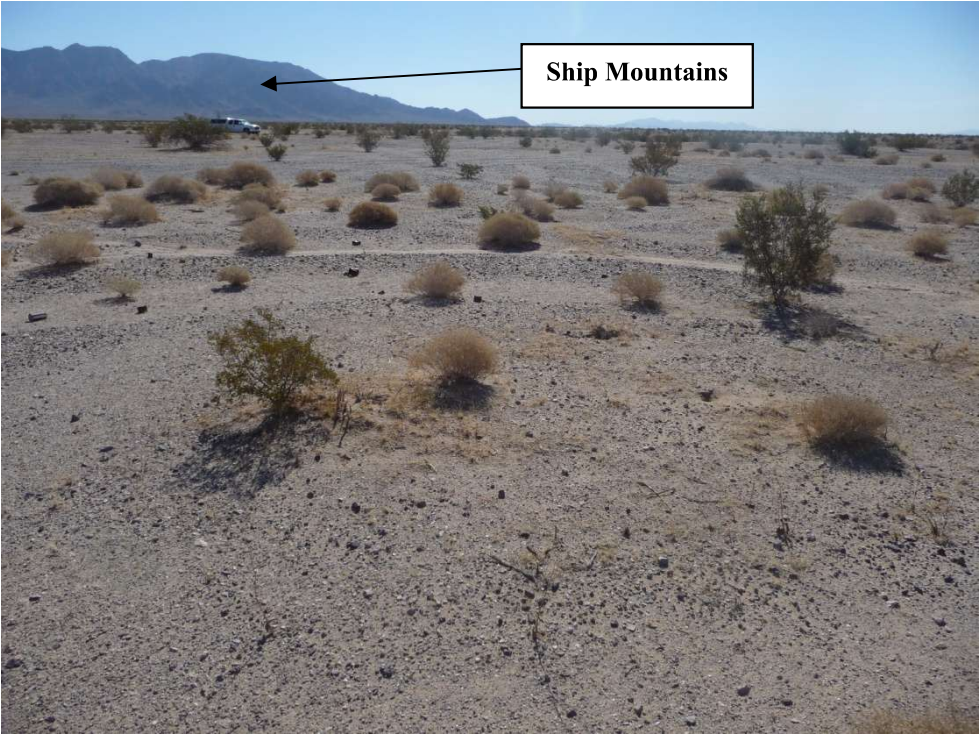


Exhibit H13. Section 23 Wellfield: View from northwest corner of Section 23, facing southeast.



Exhibit H14. Section 23 Wellfield: View from southeast corner of Section 23, facing northwest.



Exhibit H15. Section 24 Wellfield: View from northeast corner of Section 24, facing southwest.



Exhibit H16. Section 24 Wellfield: View from southwest corner of Section 24, facing northeast.



Exhibit H17. Section 27 Wellfield: View from southwest corner of Section 27, facing northeast.



Exhibit H18. Section 27 Wellfield: View from southeast corner of Section 27, facing northwest.



Exhibit H19. Section 26 Wellfield: View from northeast corner of Section 26, facing southwest.



Exhibit H20. Section 26 Wellfield: View from southeast corner of Section 26, facing northwest.

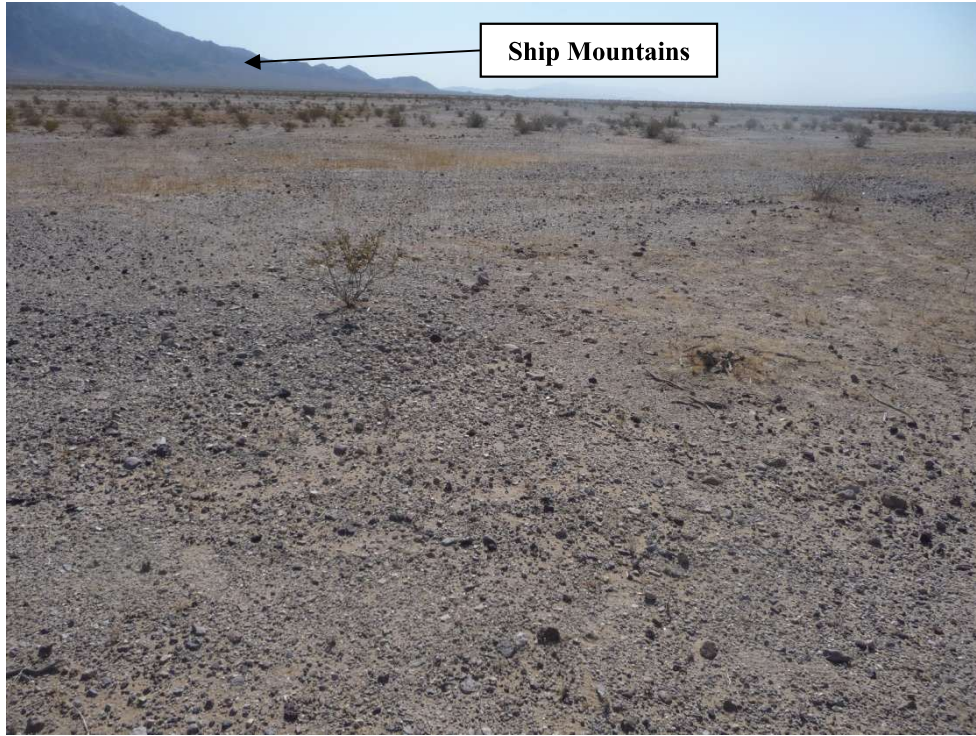


Exhibit H21. Section 25 Wellfield: View from northwest corner of Section 25, facing southeast.



Exhibit H22. Section 25 Wellfield: View from southeast corner of Section 25, facing northwest.

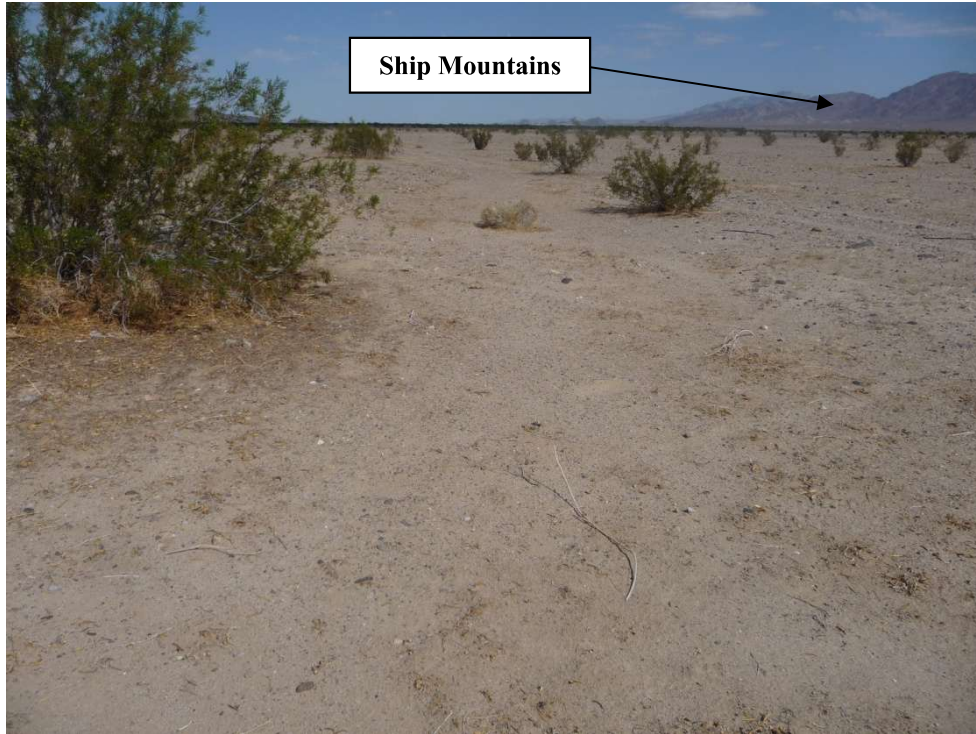


Exhibit H23. Section 34 Wellfield: View from southwest corner of Section 34, facing northeast.



Exhibit H24. Section 34 Wellfield: View from southeast corner of Section 34, facing northwest.



Exhibit H25. Section 35 Wellfield: View from southwest corner of Section 35, facing northeast.



Exhibit H26. Section 35 Wellfield: View from southeast corner of Section 35, facing northwest.



Exhibit H27. View from southeast corner of conceptual spreading basins area, facing northwest.



Exhibit H28. View from northeast corner of conceptual spreading basins area, facing southwest.

Appendix I. Photographic Exhibits of Miscellaneous Biological Resources



Exhibit I1. Anterior half of plastron of adult female tortoise that died more than four years ago near north end of ARZC ROW (Appendix C for location of “Adult Female Carcass, Dead > 4 Years”).



Exhibit I2. Plastron pieces of a subadult tortoise that died 1-4 years ago near center of ARZC ROW (see Appendix C for location of “Subadult Carcass, Dead 1-4 Years”).



Exhibit I3. Fragments of an adult tortoise that died more than four years ago on the southern half of Section 8 (see Appendix C for the location of “Adult Carcass Dead > 4 Years.”).



Exhibit I4. Active tortoise burrow found near center of ARZC ROW (see Appendix C for location of “Burrow of Adult”).



Exhibit I5. Fragments of adult tortoise that apparently died in the 1940's (see Appendix C for location of "Adult Carcass in Tank Tracks.")



Exhibit I6. Carcass shown above in Exhibit I5 was found in these tank tracks.



Exhibit I7. Badger dig with claw marks, burrowing owl pellets, and whitewash.



Exhibit I8. Badger dig in rodent colony with multiple burrowing owl signs (pellets, whitewash, feathers).



Exhibit I9. Burrowing owl pellets and whitewash at an unknown burrow.



Exhibit I10. Inactive kit fox den where three burrowing owl pellets were found.



Exhibit I11. Small openings in colonial burrow system that *would not* have been counted.

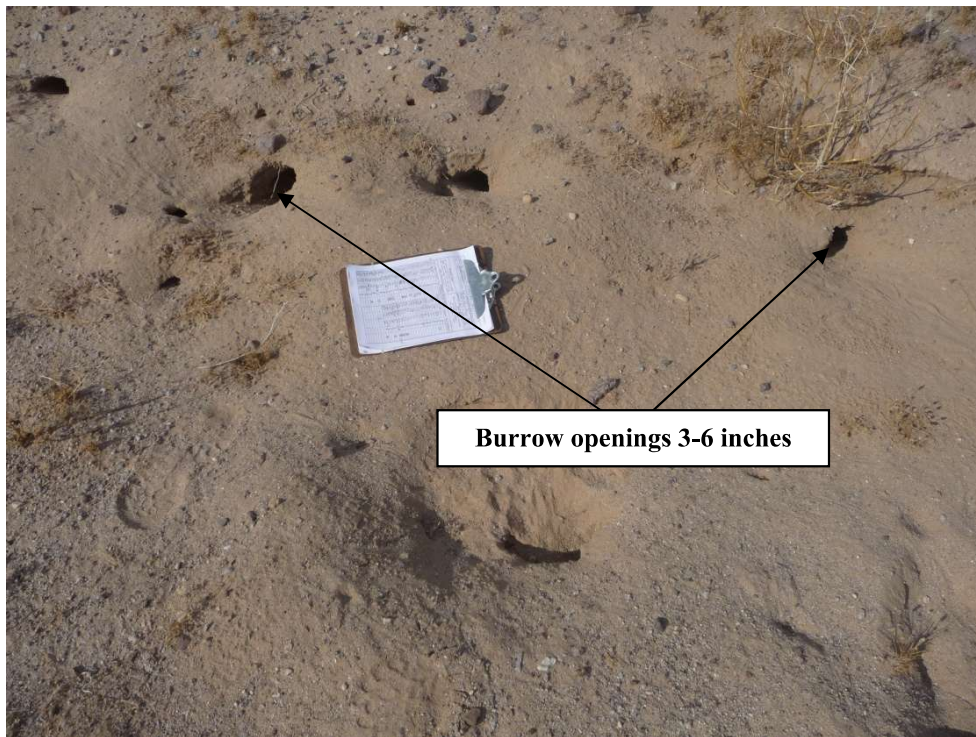


Exhibit I12. Larger openings in colonial burrow system that *would* have been counted.



Exhibit I13. Eight pallid bats found in crevice of cement trestle.



Exhibit I14. When temporarily flushed from its crevice, this pallid bat momentarily attached to cement side of train trestle.



Exhibit I15. Single pallid bat observed in the corner under a wooden train trestle.



Exhibit I16. Typical crevice under cement trestle occupied by pallid bats, with bat urine stains (?).



Exhibit I17. View of a cement trestle where pallid bats were observed in crevices in Exhibits I13 and I14, above.

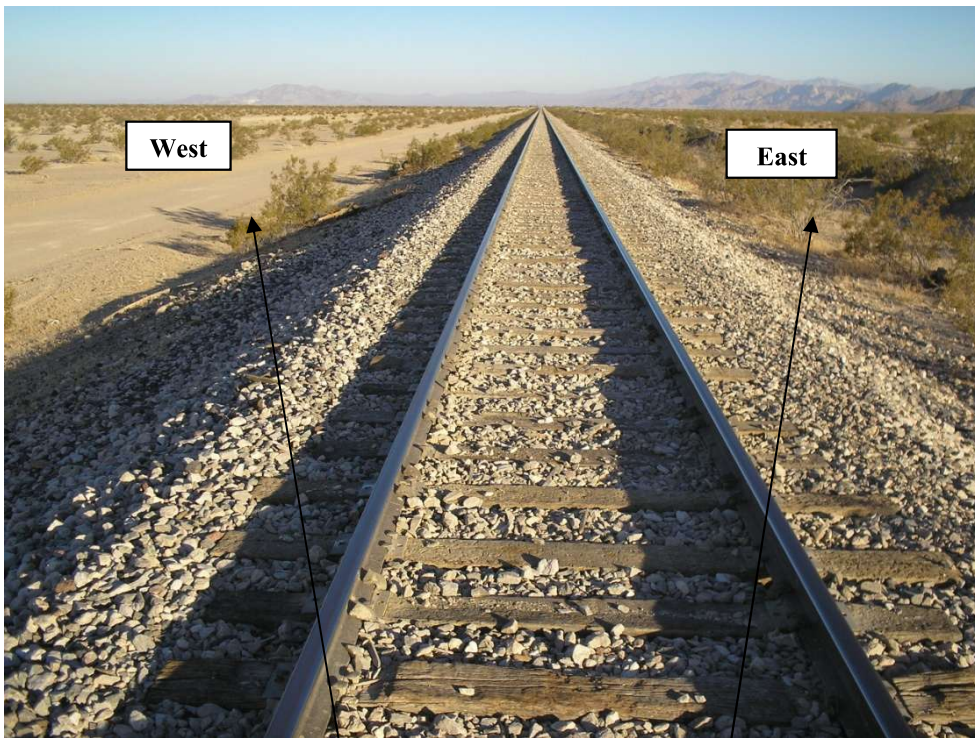


Exhibit I18. Example of degraded habitats to west versus “greenbelt” on east side of tracks.



Exhibit I19. Since water flows from east-to-west along the entire length of the ARZC ROW, washes, sometimes with extensive streamside growth, occur along the east side of the ROW.



Exhibit I20. One of a dozen well-developed drainages with smoke trees and other wash vegetation located at the north end of the proposed pipeline alignment.



Exhibit I21. 60-foot wide wash, on west side of trestle, facing west towards Chubbuck.



Exhibit I22. One of a half-dozen “washlets,” with upland plant species and rocky substrates.



Exhibit I23. Skull of a recently-dead white pelican found several hundred feet west of the pilot spreading basins located in Section 13.



Exhibit I24. Common loon found between the front tires of a vehicle in Section 27.