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**Mohave Ground Squirrel Technical Advisory Group
24 February 2016
Sheraton Fairplex Hotel and Conference Center, Pomona, CA**

Notes prepared by Ed LaRue

Attendees: Scott Osborn, Phil Leitner, Bill Vanherweg, Erin Martinelli, Misty Hailstone, Ryan Young, Bruce Garlinger, Denise LaBerteaux, Stu Richardson, Adam Walters, Marianne Huizing, Skip Moss, Jillian Estrada, Sarah Barrera, Don Mitchell, Tonya Moore, Ed LaRue, Shari Heitkotter, Lehong Chow, Glenn Stewart, Kathy Simon, Adam Walters, Amy Fesnock, Reagen O'Leary, Ileene Anderson, Judy Hohman, Steve Montgomery, Margaret Adam, John Harris, Mark Allaback, Agnieszka Napiatek, Phillip Wasz, Caleb Murphy.

Partial List of Web-X Attendees: Becky Jones, Scott Harris, Nancy Frost, Kelly Schmoker, Lisa Gymer, Kim Marsden, Marjorie Matocq.

Field Efforts for 2015 and Plans for 2016

Denise LaBerteaux and Bruce Garlinger conducted camera trapping study on 2,500 acres at U.S. Borax. This included 64, 40-acre plots, with cameras at 32 plots in 2015. This year they will camera trap the other 32 plots. Cameras positioned at center of plots, including both video and still photography, for 5-6 days. They detected 11 MGS at 6 camera sites, mostly on the northern part of the study area. They used 8 cameras at a time over a two-month period in 2015. Volunteered to leave cameras out into July and got juvenile images there. They used two kinds of baits, including bait blocks and four-way with peanut butter. Blocks were 21 to 25 pounds, so could be left out longer without maintenance. They started on March 31 with first detection of an adult female on April 15th. This year they intend to start on April 15th and monitor them through June 15. Bruce said there would be continued camera work at DTRNA, with a request for proposal to be released soon. We should work collectively to see when and where cameras may be available.

Ed LaRue trapped seven grids in 2015, including two to the south: Shadow Mountains (4,550 trap hours 3/16 to 3/19) and Edwards South (4,770 hours 3/23 to 3/26 mostly Lehong Chow); one in Inyokern (1,700 hours on 4/13 where a pregnant MGS was trapped – the only one among the seven grids); Cuddeback Lake (7,200 hours 4/14 to 4/16); and three while monitoring PG&E jobs along Highway 58: Kramer Hills (1,445 hours 5/28 to 6/7), Hinkley West (5,289 hours 5/4 to 6/10), and Hinkley East (3,038 hours 4/30 to 6/15). Areas targeted for potential trapping in 2016 include three county parks and BLM parcels in L.A. County, four grids around Kramer Junction. Between 1/28 and 2/16/2016, Ed trapped 8,500 hours on north Edwards AFB. He plans to trap a site three miles west of Harper Lake Road in early March in hopes of collecting tissue to see if hybrids are present.

Phil Leitner trapped the Coso sites, including Cactus Peak and Coso Basin. In 2010 and 2011, there were abundant MGS caught at both sites. 2015 was the first time a MGS was not captured at Coso Basin. At Cactus Peak, Phil caught only four MGS adults. Last year was a reproductive year. They will repeat this trapping in late March through early April. Wildlands purchased habitat that may be suitable for mitigation, so they want to survey these sites to see if MGS are present. Last year, Dave Delaney and Phil camera trapped two parcels, east of California City and north of Harper Lake. They did not photograph any MGS at Cal City but did get lots of MGS detections at the Harper Lake site late in the 2015 season. Phil would like to see more trapping

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down near Colusa Road in north Adelanto where there seems to be a relict population. He plans on trapping the hybrid zone in April and May.

Shari Heitkotter with CDFW did three trap sessions last year to investigate different baiting techniques for camera trapping and to compare live-trap and camera-trap effectiveness. These grids included 10 camera trap arrays at those sites. Her study included one grid with PVC pipe and bait inside so did not need to be replaced; a second one with typical baiting of live traps; and third one where there were live traps and cameras at the live traps. There were 35 meters between live traps and 150 meters between camera traps. These sites included Indian Wells Valley, Garlock Road, and the Desert Tortoise Research Natural Area. No detections on the DTRNA and Garlock site, and did get detections at the Indian Wells site during the second session in April. She used cameras and traps at Indian Wells in May, and live-caught *and* photographed seven MGS at the Indian Wells site. There were some photos of MGS that approached but did not enter traps. She may not be able to perform this study this year but plans to put out some cameras on a few CDFW sites. She found that there were few encounters at the bait-in-pipe stations, even antelope squirrels. It may be best to put out bait blocks instead of bait tubes, although Mary Logan had good MGS encounters throughout the DTRNA with bait tubes. Liana Aker has a bunch of cameras at Fort Irwin that may be available.

Phil Wasz of ECORP indicated they monitored 36 camera stations along Fort Irwin Road for five days each. Appeared they were seeing round tails, and caught a total of five animals that appear to be round tails. Bait included four-way and peanut butter sticks, which caused the animals to climb up and expose their genitals to allow for sex determination. The tissue has been given to Marjorie for analysis. There is a plan to trap a site along Big Rock Creek this year.

Kathy Simon set up 80 camera traps in the Goldstone area of Fort Irwin over 7,000 acres. They did not get any detections at the 80 cameras that were left out for five days in April and May 2015. They checked the cameras each day, and only re-baited when necessary. They also noted a very low incidence of kangaroo rats, with a high proportion of desert kangaroo rats among those detected. Lots of wild burros were photographed. She did capture some MGS (one juvenile with a longish tail) near the junction of Harper Lake Road and Highway 58, and gave those samples to Marjorie Matocq yesterday.

Aga Napiatek with Psomas trapped several grids in the Victorville/Adelanto area, and did not get anything. She and Leo Simone trapped the Hinkley 7 site (where Ed LaRue had MGS in 2014) and did not capture any MGS.

Bill Vanherweg found that the drought has significantly affected kangaroo rat populations in the Central Valley, which could also be occurring in the Mojave. Bill mentioned that he has been catching genetically-round tailed ground squirrels that have short, flattened tails.

Scott Osborn indicated that CDFW will be implementing a drought-funded project in the Central Valley and Mojave which will include camera and acoustic detector studies associated with current drought conditions.

Kim Marsden asked that anyone needing a BLM permit please get their requests into her as soon as possible.

Judy Hohman reminded us that we have three years under the DRECP to determine how significant the use by MGS in the "Bowling Alley," located west of Highway 395 up to the Kern

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County line. Phil said that he and Dave Delaney did have MGS photographs in this area in 2011 and 2012, but that the information needs to be supplemented. Would also be important to collect tissue from any MGS trapped in that area and get them to Marjorie Matocq. See additional discussion involving Amy Fesnock below.

Stu Richardson said LADWP trapped three grids last year, which were borrow sites in the northwestern part of the range. They caught lots of antelope ground squirrels but no MGS. He may do limited trapping this spring.

Request for MGS scat to train detection dogs. Liana Aker plans to research use of dogs to detect MGS at Fort Irwin, and would like some MGS scat. Please collect MGS scat this spring and get those to her. Scat can be placed in vials and provided to Liana at your convenience. It would be helpful to use a dog to detect places where trapping could occur, then set up the grids in that location.

Update on Mohave Ground Squirrel Draft Conservation Strategy. Scott Osborn reported on the conservation strategy, which is nearly complete, pending addressing comments from Jeff Aardahl and others. Not sure exactly when the strategy will be available to the public, but hopefully later this year. He plans to have other scientists, outside the MGS TAG, perform another review before it is released to the public. If upper management (Kevin Hunting) is encouraged, there may be some chance to get the strategy completed sooner rather than later. Folks are encouraged to provide their concerns with completing the strategy to Scott, who will forward it to appropriate people in the CDFW chain of command.

Break (This MGS TAG meeting was held in conjunction with the Western Section of The Wildlife Society annual meeting. So, we met from 0800 to 1000, took a break, and resumed in the afternoon from 1300 to 1600).

Mohave Ground Squirrel Bibliography. With input and review from Phil Leitner, Ed LaRue produced a comprehensive MGS bibliography of 222 references. Although a few regional trapping efforts are included, like those at Fort Irwin and Edwards AFB, he did not include reports for individual protocol trapping projects. Rhys Evans has posted the bibliography on The Wildlife Society website in conjunction with the small mammals session conducted earlier this week. Ed will continue to update the bibliography as new materials become available or as errors are identified in the existing references.

MGS TAG Website. The MGS TAG website is almost ready to go. Materials are stored in a document library, and would include pdf documents yet to be identified.

Historical versus current geographic range. The potential range reductions in terms of negative trapping surveys are mostly to the south and the western quarter of Edwards AFB up to Koehn Dry Lake, and eastern portions of Fort Irwin. CDFW is reluctant to show a formal range reduction, which was last done with Gustafson in 1993. If surveys reveal potential habitats, even to the south, CDFW would not forego protocol surveys on those lands. Phil drew the lines to show areas with no positive trapping results; not intended to drive conservation recommendations that no additional trapping would be required, for example, or that these habitats are no longer important.

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Judy Hohman pointed out that possible future climate-induced movements of MGS to the north or up in elevation would be better characterized as a “range shift” rather than a “range expansion.” So, if MGS were found on the north slopes of the San Gabriel or San Bernardino mountains, this would be a *shift* to the south rather than an *expansion* to the south. It would be good to trap the area west of Owens Lake and north of Olancho, although none was observed in 2000-2001. Kathy Simon will work with Rich Inman to show Phil’s reduction line relative to predictions based on modeling. So the effort would seek to combine the two data sets. So, it would show historical occurrences, recent occurrences, and Rich Inman’s work superimposed over those data sets.

Hybridization with *X. tereticaudus*.

Updates on genetics test results; Need for more tissue collection? Is there any morphological way of determining hybrids? It seems to be unclear by looking at the animal, measuring the tail, looking at the pelage, etc. Scott Osborn will help people get tissue sampling put onto their MOUs to facilitate more tissue collection. There is no particular protocol for submitting samples, although mailing ethanol through the mail can be problematic.

Relevance to proposed CEQA projects: Need for tissue collection; protocol and sample processing; “take” of hybrids? Marjorie Matocq joined us by phone at 13:45 to help discuss these issues. The presumed contact zone extends west from Barstow to about Harper Lake Road, south to Helendale, and north to Fort Irwin. There are more than 50 samples that have been analyzed. Back-cross hybrids indicate that a F1 hybrid is able to mate, so that these hybrids are fertile. One sample shows a back-cross with a round-tail, and many show back-crossing with MGS. Hybridization is certainly a threat to genetically-pure MGS and could lead to more rapid deterioration of the eastern range boundary. We assume that Rich Inman has not modeled range extensions of round-tailed ground squirrels into the MGS range. Kathy Simon has found that round-tailed ground squirrels are more tolerant of higher temperatures, and Phil has found that they seem to benefit from human disturbance.

Does Marjorie need more tissue collection from this hybrid zone? Absolutely; especially between Barstow and Kramer Junction. Marjorie will work with Phil to determine key areas where we should be sampling for hybridization. She would also like to have samples from different animals on same and neighboring grids to determine how related these proximate animals may be. She believes that the current evidence supports the conclusion that the expansion of round-tails is rapid. The Hinkley Valley has been well sampled by Bill Vanherweg, but more tissue would be useful even of round-tails. It may also be important to collect round-tail tissue from animals in Lucerne Valley. We should be collecting a minimum of about 10 samples in a given grid or study site. Scott would like Marjorie and Phil to develop a strategy for tissue collection; where to collect and where it is not necessary, sample size, etc.

Marjorie plans to use single nucleotide polymorphism tests that are more sensitive than genetic satellite analyses, and provides much more detailed information in the data set. This will allow for much finer resolution of scales of divergence; where there are now three major genetic demarcations, this new process will see if there is more divergence within any one of these three regions. She refers to this as “genotype by sequencing.” The analysis would also allow her to

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look at the degree of hybridization, beyond F1 and back-crossed hybrids. Marjorie has sufficient funding to assess all the samples she already has and all that can be collected this spring. The new methodology requires that she combine as many as 90 samples, and that an assessment costs about \$2,500, whether it's one or a thousand samples. She wants all samples, regardless of where, and for both species (though not so much for round-tails).

What is the situation where an incidental take permit for take of hybrids should be issued? There is no firm policy, and really no process for analyzing the tissue. If there is a hybrid that generally means that an MGS is nearby and that a take permit would be required. This also means that we should continue to trap animals between Barstow and Hinkley even if a suspected MGS is captured to see if there are round tails and then hybrids. So, don't leave just because a MGS is caught in this area. It would be better to change the protocol than to determine this on a case-by-case basis, and that the protocol may need to be changed to require three-session trapping rather than leaving the site at the time the supposed-MGS is caught. If you capture a round-tailed ground squirrel in the MGS range, it is important to contact the CDFW biologist to discuss the ramifications, and genetics should be determined.

Desert Renewable Energy Conservation Plan (DRECP) Update. Amy Fesnock was here to talk about DRECP. The comment period is closed, we're in the middle of protest resolution, and the Record of Decision will not be issued in March, as first expected. West Mojave Plan (WEMO) identified a MGS Conservation Area (MGS CA), but adopted Alternative B instead of the A, which has no compensation for MGS take. The Wildlife Habitat Management Area (WHMA) was also designated under WEMO. The DRECP does away with the WHMA, and replaces it with an ACEC, which is a series of polygons between other existing ACEC's but all are to protect MGS. 980,000 acres are protected under DRECP, with a 1:1 habitat compensation in most places, 2:1 in core areas and linkages. There are eight CMAs (Conservation Management Actions) specific to the MGS, with 95 pages of CMAs for all species and resources that may affect MGS conservation.

In WEMO, the disturbance cap was applied to new disturbance. Under the DRECP, the disturbance cap applies to all disturbances, including unauthorized activities. DWMA's are being eliminated in favor of ACEC's. The disturbance cap is 0.5%, which is down from 1.0% in DWMA's under ACEC's. There is a DRECP measure that requires clearance surveys for authorized projects. How this is done is unclear, but may be something like burrowing owls, through passive dispersal. The DRECP is expecting CDFW to determine what clearance survey protocols may be. There is a concern that there are specific polygons identified as "survey areas," which left large areas that were identified as "no survey" areas. Page H-53, Figure H-8, Section H.2.12 are the maps in the Draft EIS for the DRECP that show no survey areas for MGS.

The "Bowling Alley" is located north of Highway 58 and west of Highway 395. The CMA applying to this area is there will be no solar development in this area for the first three years after the record of decision pending county's development of a habitat conservation plan. New data needs to be collected to determine if MGS occur in this area and if there is an important reason to protect it.

Project Review and Impact Minimization.

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Clearance survey protocol. If an MGS is located, it may have to be moved to another site, but CDFW does not currently support translocation. Currently, the DRECP says that clearance surveys would be conducted to move MGS out of harm's way. USFWS is required to issue incidental take numbers for tortoises, so presumably, CDFW would also need to keep track of how many MGS are displaced or accidentally killed. Currently, CDFW just allows for take of an area without quantifying how many animals (MGS in this case) are affected. MGS could be trapped, held, and released after the site was bladed or graded, but nothing was really decided. Dogs could be used for clearance surveys to locate specific burrows that the dog may identify as being occupied, and excavate those burrows, only. Phil related that a very sensitive dog could detect a MGS that was there a month ago. However, they may be very effective in identifying areas where there are no MGS.

Impact minimization measures for MGS – Burrow excavation; Alternatives? ITPs currently say that all burrows potentially occupied should be excavated or inspected by fiber optic cables. Scott suggested that a small team look at protective measures in incidental take permits and provide feedback on how the measures may be improved. Ed LaRue and Aga have agreed to look at this issue, and work with Reagen O'Leary and Scott Osborn to do this.

CDFW policy on change in occupancy status of sites? If a site previously was determined to be occupied by MGS subsequently had negative protocol survey results, would CDFW change the site status to "presumed absent?" Positive survey results are good for more than one year, so there would be no need to survey this site; it should still be considered as occupied. Even if not present, it would still be considered good habitat because it was recently occupied.

Update on Research and Monitoring Priorities list.

Research priorities. These include monitoring core populations and other population centers, which are being funded by BLM for Little Dixie Wash and Coolgardie Mesa for 2016. Monitor trends in occupancy, which would repeat camera studies every five years, at \$400,000 for each effort. Study interactions between MGS and round-tailed ground squirrels, which could cost a million dollars and perhaps be a graduate thesis. Need to look for MGS in data gap areas. Identify important areas for acquisition was identified but not really planned. Also need to revisit specific areas to study potential shrub compensation in key areas. Edwards data may be the best to use for this long-term study. Since this is being funded by Department of Defense, Phil would be looking to perform studies at Edwards, Fort Irwin, and China Lake. Don Mitchell felt it was important to combine walking auditory surveys in conjunction with trapping surveys.

Misty Hailstone indicated that Department of Defense does fund ideas through their syber program to develop new technologies. It may be good to develop a technology wish list, such as burrow cameras. Since MGS with radios attached can be detected during dormancy, could use ground penetrating radar to study the underground burrow system.

Camera survey protocol and update. Is it possible to prove absence for camera studies? With protocol trapping, there is a result that determines presence/absence, but not so for cameras. Dave Delaney and Phil Leitner had several 10-camera arrays on the two mitigation parcels they

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camera trapped last year. It would be good to enlist a statistician to set up a study that could compare the efficacy of live trapping to camera trapping.

What is the best way to attract MGS to cameras? There are three basic techniques including bait blocks, PVC tubes with bait inside, and a pile of grain with a peanut butter stick (which is good to raise the animal up to determine sex). Mary Logan was very successful using the bait tubes, which minimize the amount of maintenance visits to the camera stations. Both inexpensive and expensive cameras have been used successfully, from the upper end Reconx to the less expensive Browning Dark Ops and Bushnell cameras. No clear formula for the ratio of live traps to camera traps.

Identify funding sources. Judy Hohman led a discussion on grant sources for money, which Scott Osborn fully supports. One thought is to tap into the NGOs associated with this group to see if their personnel can advise us on how to secure grants. American Society of Mammalogists may be a good group to contact.

Wrap-up; Schedule next meeting; Identify topics and tasks. We should have the next meeting in the fall, likely Ridgecrest, to be determined through a Doodle Pole.

These minutes were recorded by Ed LaRue and are subject to his interpretation. They were reviewed by several MGS TAG members, including Phil Leitner and Scott Osborn, prior to being considered finalized.