Mohave Ground Squirrel Technical Advisory Group
Meeting Notes by Nicole Cornelius, CDFW
21 MARCH 2018
Bureau of Land Management, Ridgecrest CA

Ridgecrest Attendees: Phil Leitner, Becky Jones, Scott Osborn, Howard Clark, Carrie Woods, William Vanherweg, Denise LaBerteaux, Cindy Hopkins, Daniel Leavitt, Shari Heitkotter, Bruce Garlinger , Karen Whitfield, LeHong Chow, Erica Orcutt, Heather Elder, Lisa Gymer, Erin Whitfield, and Jose Lopez

Remote Attendees (partial list): Ileene Anderson, Kim Marsden, Amy Fesnock, Marjorie Matocq, Scott Harris, Dave Hacker

Review Agenda: Scott discusses the agenda for today.

Review Action Items: The actions items list distributed by Scott was discussed and the sheet updated, which is given as an attachment to these minutes (so not reiterated here).

Field Efforts of 2017: Phil Leitner was wondering if anyone else was able to successfully live-trap MGS in 2017. It doesn't appear anyone was able to successfully trap MGS in 2017. Camera trapping was successful at Freeman Gulch. It was suggested that camera trapping should be for 8-10 days to increase detections. Howard Clark trapped Lucerne Valley, no MGS. Future research, comparing live-trapping vs. camera trapping. Advantage of camera trapping vs. live-trapping. Leave cameras out until August.

LIANA M. AKER-For Fort Irwin - Western Training (formerly Expansion) Area:
2 June, 2017: adult (suspect male, not certain)
15 June: adult (probably same individual as the 2 June detection)
5 June: adult, suspected female
20 June: juvenile, unknown sex

Field Season 2018:

Phil Leitner (PowerPoint): Four core areas are going to have work done in 2018. He thinks this is a good idea because he believes that MGS populations are down. Little Dixie Wash, Coolgardie Mesa, and Coso are live-trapping only. Edwards is both camera-trapping and live-trapping. Coso work begins tomorrow. Little Dixie no MGS last year. 2016 Freeman Gulch 1 emaciated female. Coolgardie Lane Mountain 2 MGS, 2002 Lane Mountain 4 MGS, 2017 no MGS, possible sighting of young one. Barstow- Camera trapping MGS picked up to the west of Iron Mountain/ Harper Lake road trapping. No MGS caught or seen east of Harper Lake road. Phil predicts we may find MGS crossing Harper Lake Road. BLM has asked trapping occur in DFAs, new survey areas. Four DFAs in MGS range, north of Kramer (Bowling Alley), Searles Lake, Haiwee (Rose Valley), and Kern Dry Lake. Live trapping, camera trapping and shrub sampling at 4 DFAs. 45 cameras out in those areas, run for 10 days. Rows of five cameras at 9 different sites. Kramer DFA, 3 camera sites are not random for 10 days. Will camera trap again later in May. Live trapping in Kramer, later in the season. Searles DFA around lake bed. Camera trapping and live trapping are located where there is decent vegetation, hard to come by. Cameras out right now. Kathy Simon did trapping along 178 caught MGS including young ones in this area. 2011 Dave Delaney and Phil caught

MGS on camera here. Haiwee DFA, occasionally MGS caught. Camera traps are set up in the area. Live trapping as well, sites not selected yet. Barbara and Phil are working on a habitat suitability model with Todd Esque and others at USGS, which will incorporate the CDFW extensive vegetation mapping in 2016. The hope is that this will lead to a new, better MGS habitat suitability model that includes vegetation. There are MGS hotspots on the grids. Coso Basin site, number of same animals caught over six years. Cactus Peak site, number of same animals caught only over three years. Living longer in Coso Basin? Southern part of the range has been severely altered by sheep. Unprecedented trapping records, extremely low. Numbers are down at the three core areas. Contact zone- MGS seem to be able to reproduce even in low rainfall seasons (1 ½ inches) and poor vegetation. Coso study area has different results, greater than equal to 3 inches needed for reproduction. Look into solar stations rainfall data. **Becky Jones to look into rainfall data in solar project areas**. Conclusion is there is something strange going on in contact zones. CDFW TSSM hundreds of monitoring sites with cameras, 4 ground squirrel species – no MGS in Mojave Desert. 2016-2017 camera trapping, AGS caught but no MGS. Permanent baiting block used. **Scott to look into survey protocol for CDFW TSSM**. Data may indicate that indeed MGS numbers are dropping.

Jose Lopez: they have already seen MGS on their camera trapping this spring, 3 out of 5 camera sites on EAFB. Presence-absence data used to select sites. They are sampling 25 locations. Cameras are 300 meters from each other, different than the norm. 8 cameras used per site. 3:3:2 900 x 650 meters. Leaving the cameras out for seven days. 5 locations per survey period. 2009-2010 MGS found in the southeast of the dry lake, 1994 south part of lake survey MGS found in west and east, mostly east. Now they are surveying that area again and they have found them in the west again. None detected on the far west side. Edwards hasn't had much issues with ravens. Squirrels like bird seed and peanut butter. Trader Joes unsalted smooth peanut butter used.

Denise LaBerteaux- Mentioned there is an RFP for Fort Irwin, north of Goldstone, which would involve camera trapping for MGS.

Carrie Woods - housekeeping, where bathrooms are, earthquake under table and active shooter go out the door to the right and exit.

Scott reported for Liana Aker (Fort Irwin): 16 cameras out in the western area. Poor rainfall this winter. Will hopefully present results at fall TAG meeting.

Dan Leavitt- China Lake has a potential RFP for MGS occupancy in 2019, live trapping or camera trapping. Distribution records more important than collecting DNA, so camera trapping may be better (more bang for their buck)

Bill Vanherweg- protocol trapping south of Fort Irwin road

Phil for Trisha Farmer (state parks work)- Onyx OHV camera study for MGS – fairly extensive

Sheri Heitkotter- Fremont Ecological Reserve lightning bolt area, route 50, … can go into a few places. Camera trapping using bait blocks.

Lehong Chow- repeating camera study at normal site

Amy Fesnock- DRECP update: the DRECP has been opened for public scoping. This is very broad scoping. Specifically it is to give local governments a chance to give more input. Two executive orders made since DRECP was amended. May extend time period for public comment. The intent of the scoping is to get substantive comments to see if they need to make changes to DRECP to make things easier. They need new information sent to them, which has occurred over the last couple years. Three categories will be used to determine what the comments mean: 1) BLM LUPA needs to be amended 2) clarification of language and 3) outside of the scope of the BLMs authority. Once all comments are received and cataloged BLM will determine if the DRECP needs to be amended. They are in an unusual position with this -- normally they have a straw-dog proposal, but they don't have a lot of direction at this time. They are just using scoping to determine if changes need to be made. Scott asked if she thinks there will be an amendment, she said she thinks there will be a small change. Scott, what's the timeline for comment catagorization? 30-60 days to review and sort comments. If LUPA is needed it would be relatively fast process.

Erica Orcutt- Preliminary occupancy analysis (PowerPoint)-Objective: What covariates are influencing MGS habitat choice. 6 to 12 sites were selected from the study areas. October 1st to March 31st is winter season. Species detection is not always perfect, we see them but we don't trap them. So occupancy analysis models are developed, which Erica is working on. R software was used to analyze the data. Model evaluation using AIC, determines which model is the best model to use. Preliminary data shows that shrub foods are an important variable and so is date. Scott asked why relative date and not Julian date? Erica said it was because there was some variation on start date. She doesn't think it will result in a change in results. Results indicate that spiny hopsage is important and winterfat is at the bottom of the list. Phil said that this data is based on Coso diet analysis and Erica's data is for south of Coso. First slide of graphs shows probability of detection and occupancy data vs. shrub density. This is based on food shrubs, not all shrubs. Spiny hopsage had good confidence intervals whereas saltbush has abnormal confidence intervals. Unknown at this point what is causing this. Winterfat shows it has no effect on MGS occupancy. Unknown reason why.

Scott- Update on CS: Background on CS, we have been working on it the past several months. Randi Logsdon and others wrote the preliminary draft during the peak of the DRECP development. We are addressing comments and bringing it up-to-date. We are hoping on having a new draft by June 30th. CDFW staff to review and then present to TAG in the fall. Becky Jones comments she is happy to see it is being narrowed down. Phil asks if it will go through internal review, Scott says it will. Phil says he thinks that the CS should make realistic list of what should be done, and not add too many wishful thinking research. We are going to prioritize the research suggestions and talk to CDFW staff. Make sure the suggested research is realistic, i.e. sample size and funding possibility.

Misc. Scott: Bibliography- **Ed LaRue requested that Scott announce that the bibliography exists and to email him with updates.** BIOS database spreadsheets will be requested if you haven't submitted it. Erica asked if there are people that don't have MOUs, but do camera trapping, how do we get the survey results for BIOS database? CDFW doesn't have a regulatory hook for camera trapping. Camera trapping is not considered harassing, so no MOU needed per CDFW personal.

MOUs: Scott, we are working on getting MOUs out and we are working on a new MOU template. The changes are aimed to streamline the document, clarifying areas. Nothing very dramatic with regard to procedures and requirements. Eventually we will change the template for all listed species, but right now it's just MGS. Howard asked if MOUs would be split between species. Scott says eventually he would like it to be that way and for now MGS will be standalone. Phil said he has many people ask him what the person has to do to get permission to handle the species. Phil is wondering if there are any specific requirements that people can follow. Is there any interest in developing this? Scott said there the underground regulations issue makes it difficult to make specific requirements. There are some general requirements. Scott said CDFW continues to rely on letters of recommendations to help evaluate applications.

Marjorie Matocq: Genetics study update (PowerPoint)- This is an update on where she is at with genetic samples. The samples are from years ago. She has received multiple samples since then. Map shows sites where she has the most samples from. Looking at the next generation of genetic analysis, using new methods we can look at much larger sections of the MGS genome. We use the DNA extractions from long ago, use EcoRI to cut DNA, ligate (glue) illumina adaptors (primer sites) to fragments, amplify with illumine PCR primers, then sample is sent to sequencing center. Each individual has its own barcode, making it easy. The sequencer then give us 120-150 base pair sequences. Then when all DNA is aligned with each other. We had 700 squirrels to begin with, resulting in 800,000,000 sequences. This resulted in 25,550 SNPs from 608 individuals. High quality results. Principal coordinates plot shows big cloud of MGS, smaller cloud of RTGS, and even smaller area that are hybrids (mixed microsatellites). Amboy individual is 100% RTGS, and is an oddball. HE= Helendale HI=Hinkley. The HI closes to the MGS cloud, may be a backcrossed individual or may be just MGS. Phil said that he is surprised that there are so few hybrids. Marjorie said the other individuals that were suspected of hybridization didn't sequence well, but they can be looked at later. Phil asked if she gets the impression that this is extremely rare. Marjorie said yes this is very rare, but the loss of foreign DNA happens quickly. She can run tests on the samples later to see how many had and lost this foreign DNA. Bill asked if the Edwards sample he collected was a hybrid, he thought it was. Marjorie said that she didn't see it and it could have just not sequenced well. She would have to go back and look for the individual. $40,000 to figure out an individual's genome. Need more genomic information to determine specific gene functions. What are some opportunities for funding for genetic research? Mitigation does not include research. California Energy Commission may fund genetic research. Bill asked if any of the hybrids they knew before running this new genetic analysis fell out because of this new technique. Marjorie said no, not that she knows of. Further analysis maybe needed. Phil was wondering if this new genetic analysis could help identify gene flow between core populations, helping to establish linkage areas. We need larger sample sizes for each population. 10 individuals needed from each population for core population genetic analysis. Scott asked if there is any area she doesn't want samples from. Marjorie said no, we still need samples everywhere for long-term analysis.

Disease Screening- Scott- Contacted Deana Clifford about disease screening MGS, and she gave some suggestions for disease screening. Deana and Janet Foley supplied materials for screening 30 MGS for ectoparasites and tissue samples (ear snips). **Get in touch with Scott if you are interested in learning how to collect the samples.**

Field Methods- Dave Hacker- Camera trapping methods- Last protocol was from February 2017, Phil/Dave Delaney/**and Dave Hacker finalized a protocol and it is at the point where the protocol should be submitted to the TAG group for final review**. Dave has loosely applied this in his surveys. Scott would like to update the presence absence survey protocol to include camera trapping. Dave Hacker agrees. Phil asked if there are many people using camera trapping for mitigation? Dave said they have very few people who have contacted him with results with camera trapping, not a lot of implementation.

MGS Survey Guidelines overhaul- Scott- would like TAG member's reactions to these guidelines. Is camera trapping adequate for surveying or do we still need live-trapping? Phil said there has been a suspicion that MGS check out the bait but don't go into the trap. Cameras would be nice to confirm this. Begin opening traps at sunrise. Add to protocol, only do the species you are working on during trap checking, do other surveys later when not checking traps. Scott wants to know how hard it would be to use single-use gloves for every MGS handled. Bill said it wouldn't work for him because the gloves would rip on the traps. Scott suggested a possible alternative would be hand sanitizer between MGS. Also handling bags need to be cleaned. Phil asked if there are diseases with MGS that we need to check for or if there is data on diseases. Scott said that's why we need to do this new disease screening. Nothing is being implemented yet these are all suggestions. Change the protocol to keep trapping at a site even when one is detected, this allows for a better understanding of abundance. Mitigation is based on how many of the species are there, how can we do this accurately if we stop? Other- trappers required to have degree? Suggestion to substitute some education for experience. CEC requires designated biologists have a degree in biology. Problem is people are not submitting all species of special concern to CNDDB. Some clients get upset when biologists report species they aren't contracted to look for. If the researcher has an MOU, the MOU says you are required to report and researcher can show this to the client. Spread trapping effort- some people can't cover as much area as others. We might need to start transitioning to camera trapping by using cameras at live-traps. We lose the chance to collect genetic samples at cameras. Bruce suggests doing live-trapping from March to May and then do camera trapping after. Phil said that one thing to keep in mind is that if you set your camera up near the edge of urban areas they may disappear, don't make cameras required because some areas it's not practical.

Erin- asked where can we access most recent camera trapping protocol for TAG members to review? Scott will put on website or email if you requested.

Bruce- add audible survey guidelines April 15 through May. Bill said you can't have this required. Scott- said it could be used for presence of MGS, but not absence.

Jose- is there any research on marking the MGS to determine which individuals return to the camera sites vs. live-trapping.

Bruce- said we should try to put camera traps up at live-traps, to help prove how trap shy MGS are. Phil agreed.

Meeting adjourned at approximately 3:30 pm.