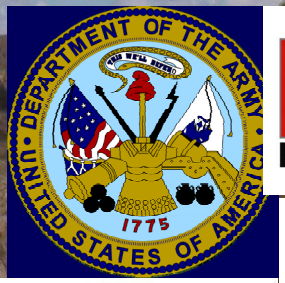
New Methods for Surveying and Monitoring Mohave Ground Squirrels: Preliminary Data

David Delaney

Phil Leitner

Desert Managers Group meeting

August 26-27 2009



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Performers

David Delaney	Technical POC, Research Wildlife Biologist/ Bioacoustician, USACERL
Dr. Phil Leitner	MGS Expert/Researcher, CSU-Stanislaus, ESRP
Clarence Everly	Natural and Cultural Resource Manager, TNC, Fort Irwin
Field Biologists	Tyler Godin, Laura Moreton, Ryan Young, Bill Vanherweg, Alex Brown, Jeff Johnson, Elina Rios, Karla Flores and Kristen Mobraaten

Background

- Surveys within the known distributional range of MGS have been limited due to funding availability, survey costs, availability of trained personnel, etc.
- Resource managers and regulators need updated information on the presence, density, distribution, and population numbers of Mohave ground squirrels (MGS)
- Cost effective techniques/technology are needed to assist in locating MGS throughout its range
- Audio and video technology offer potential new ways for surveying and monitoring MGS over wide areas
- Audio/video systems may assist in determining future trapping locations and improve trapping effectiveness

Technical Objectives

- Confirm that ground squirrels readily visit bait stations and are not bothered by the presence of audio/video recording equipment
- Investigate the effectiveness of audio/video equipment in detecting ground squirrel presence compared with conventional trapping surveys
- Investigate if vocalizations can be used to effectively identify MGS and distinguish between other ground squirrel species
- Provide natural resource managers and regulators temporal and spatial data of MGS presence to improve management capabilities so they can be proactive in their decision making processes

Technical Approach

- Eight 840 x 105 m grids were used in 2009, 4 grids were trapped/surveyed in April and 4 others in May
- Audio/video systems recorded potential ground squirrel presence (3-5 systems per grid)
- Stratified random placement of audio/video recording equipment within grids
- Monitor for the presence of MGS and other ground squirrels for 5 consecutive days
- Compare relative detection probability between trapping and audio/video systems

Sample Data Collection

Video

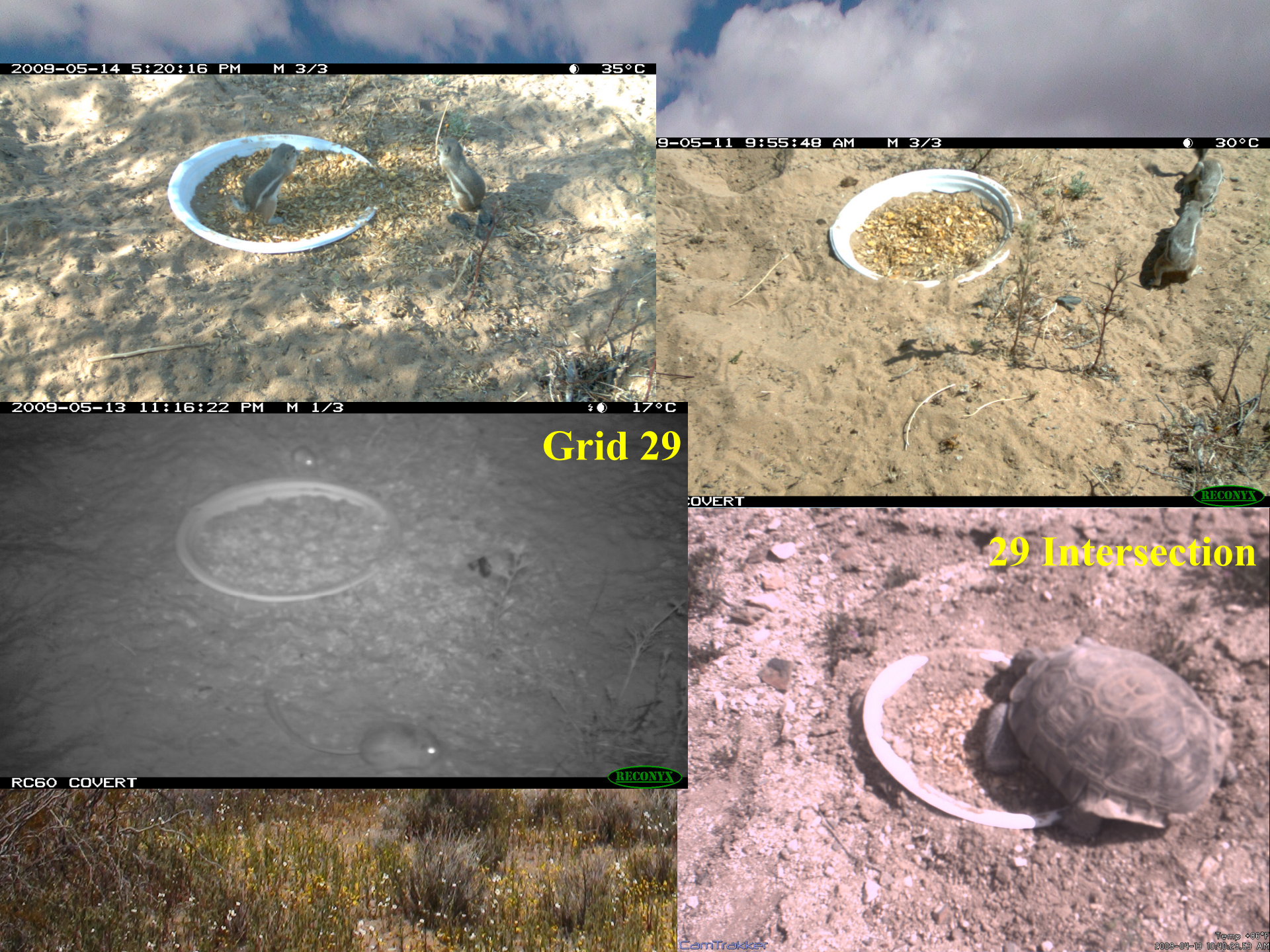
- Ground squirrel presence
- Intra- and interspecific interactions
- Relative number of visitations/day
- General visitation times
- Individual/group behavior at feeding stations

Audio

- Number, frequency and timing of vocalizations
- Identify types of vocalizations
- Identify potential associations between vocalizations and response behavior
- Detailed spectrograms for various ground squirrel vocalizations

Samples of Trail Video/Camera Data

Cholla Garden


2009-05-14 5:20:16 PM M 3/3 35°C
9-05-11 9:55:48 AM M 3/3 30°C
COVERT
RECONYX
2009-05-13 11:16:22 PM M 1/3 17°C
Grid 29
RC60 COVERT
RECONYX
29 Intersection
CamTrakker

Cholla Garden
04-18-2009 09:39:28
PREDATOR

44:09 PM M 1/3
Grid 29

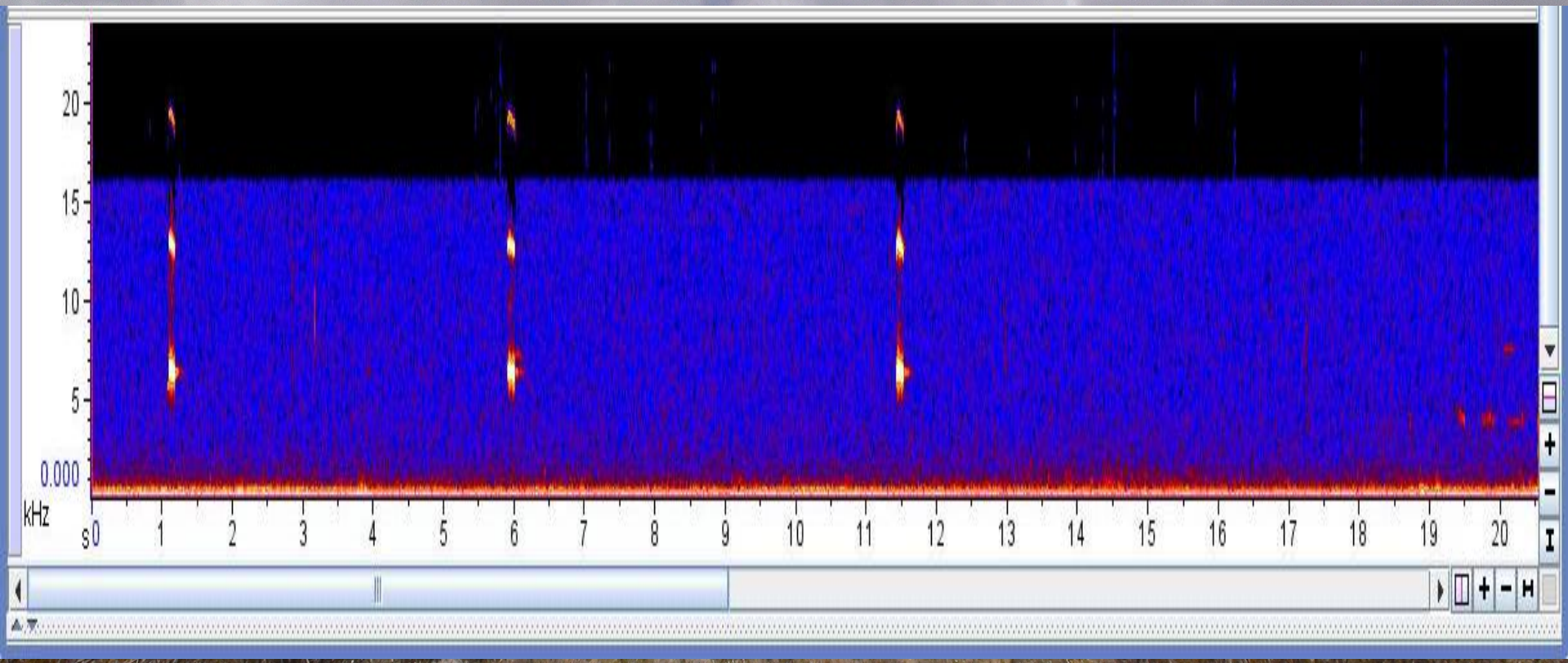
Preliminary Trail Camera Results

- Detected presence of MGS and AGS
- Detected other animals at feeding trays (e.g., kangaroo rats, lizards, tortoise, ravens)
- Ground squirrels readily visited feeding trays over consecutive days, multiple times/day
- Took a few hours to 1-2 days for squirrels to find food
- Detected comparable and/or greater numbers of MGS at same grids as trapping surveys
- Recorded intra- and interspecific interactions at feeding trays

Preliminary Vocalization Data

- Detected MGS vocalizations in areas where we also detection them using trail cameras
- Recorded MGS calling bouts that lasted for extended periods both with and without an observer present
- Recorded a variety of different MGS vocalizations, from single note calls that are somewhat similar to RTGS, to double note calls, to trill like calls more similar to AGS calls, but not nearly as rapid
- Strong winds reduced effective recording range and may have masked some squirrel vocalizations

Spectrogram of RTGS 1-Note Call



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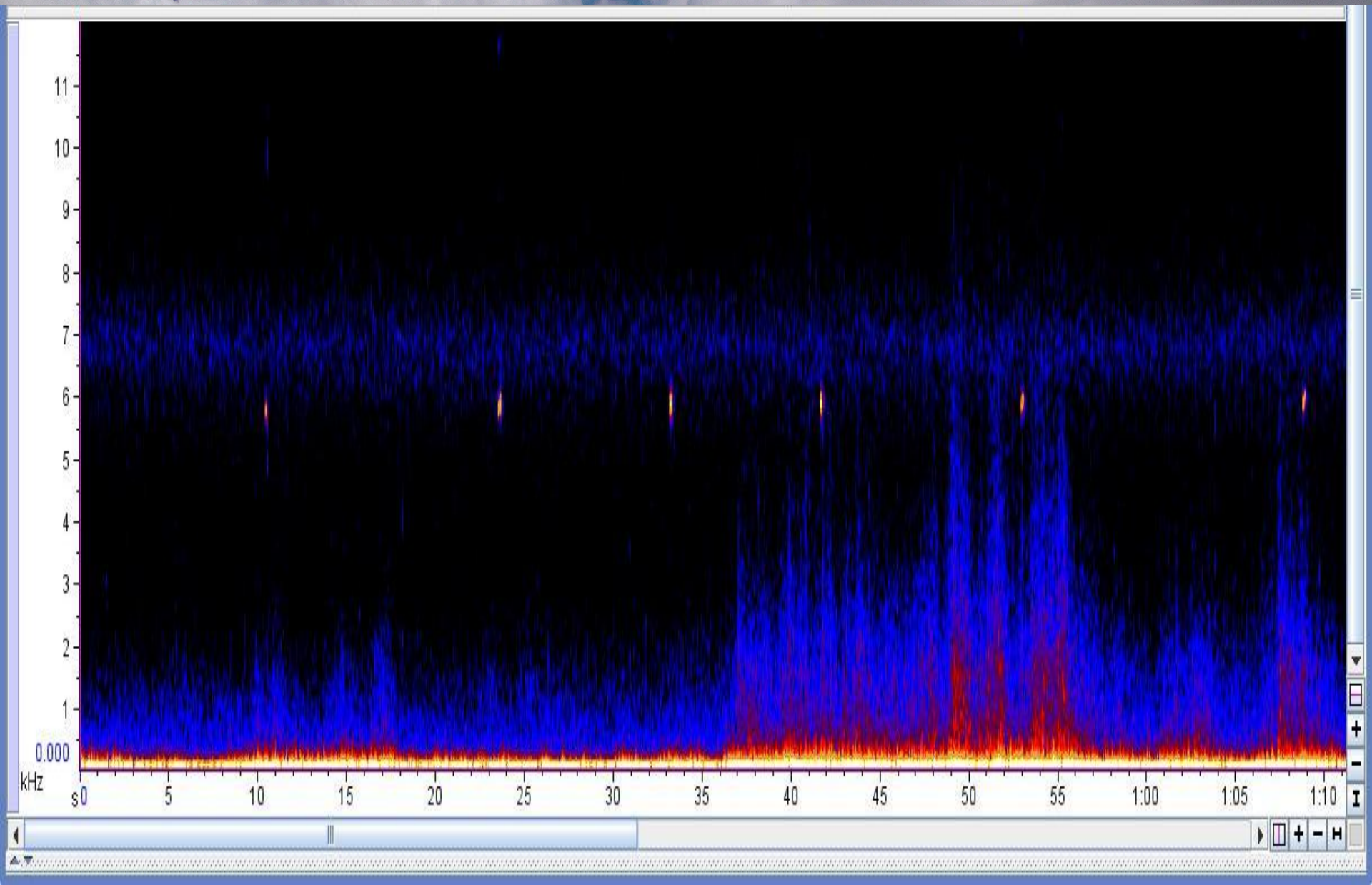
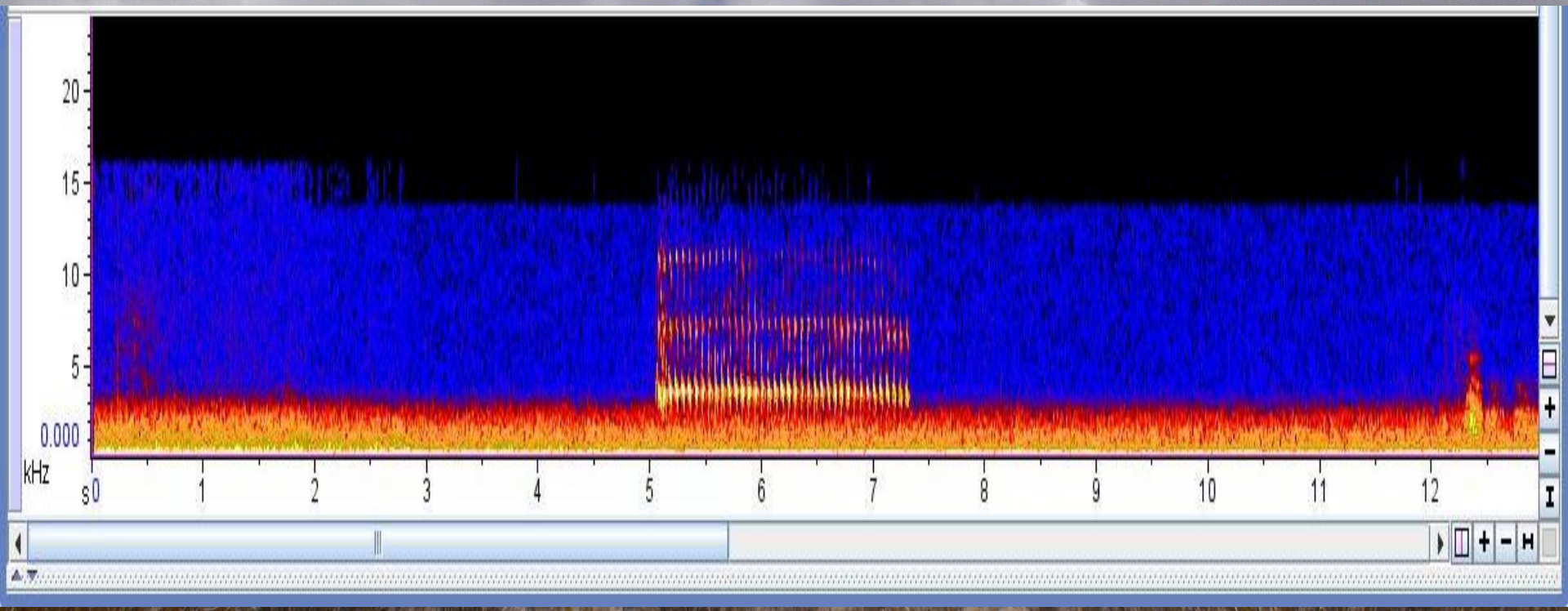
Spectrogram of MGS 1-Note Call

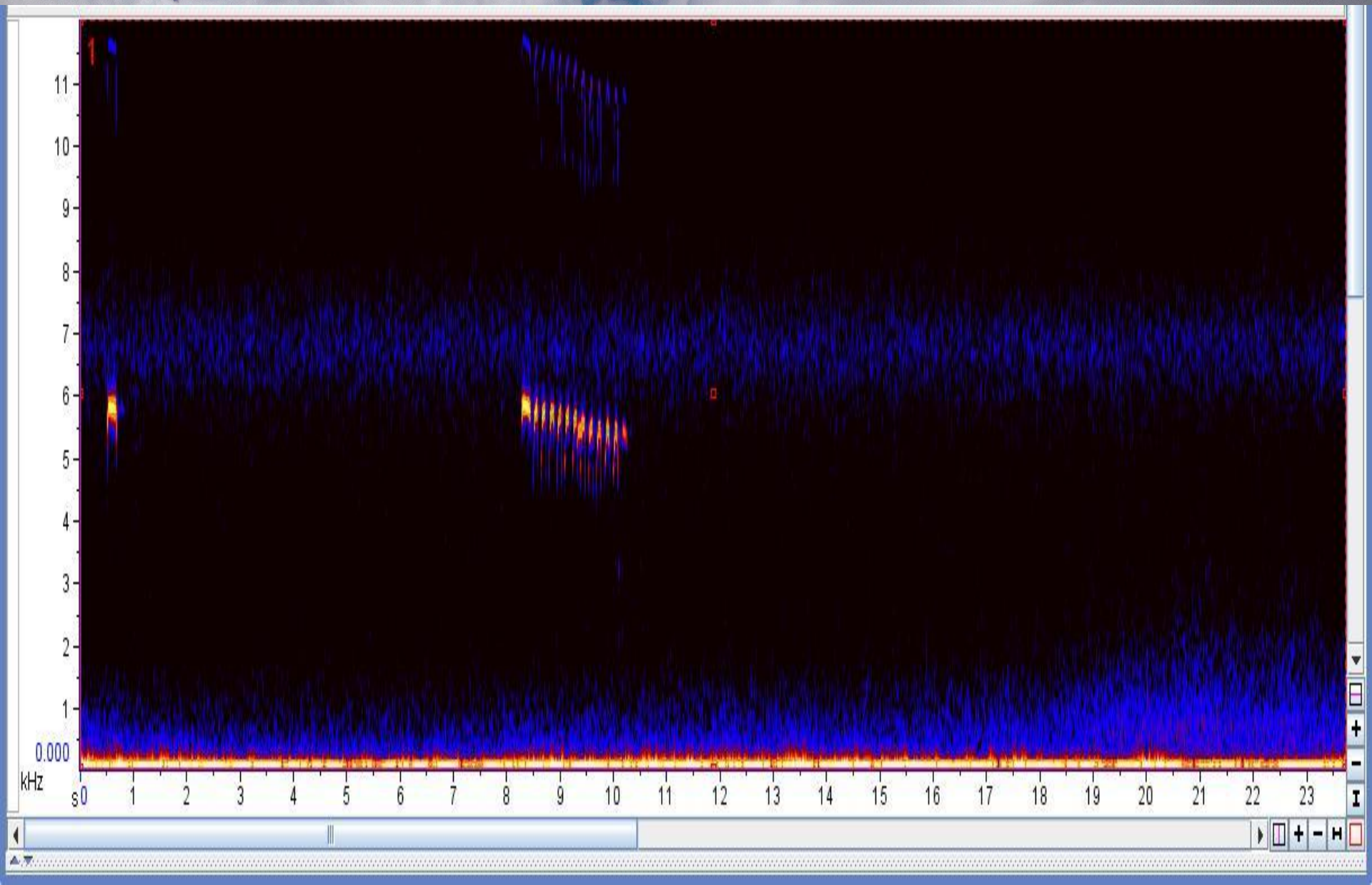


Spectrogram of AGS "Trill" Call

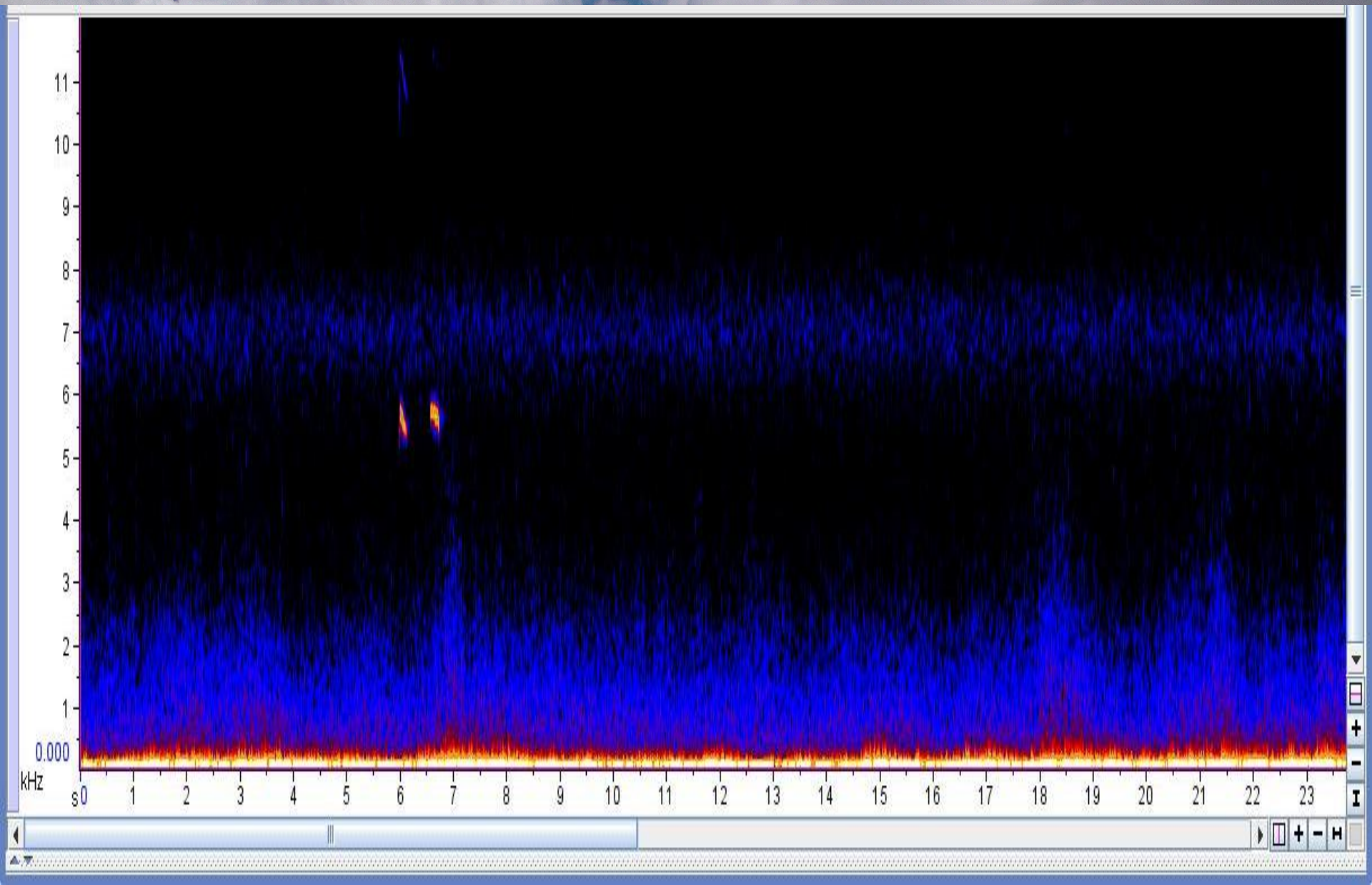


With permission from Ryan Young

Spectrogram of MGS "Trill" Call



Spectrogram of MGS 2-Note Call



Benefits of Audio/Video Systems

- Ground squirrels readily visited feeding trays and do not appear to be hindered by audio/video systems
- Allows for identification of different ground squirrel species (need to confirm ability to identify RTGS)
- Does not require specialized knowledge/training
- Does not require special permits
- Field deployment and data extraction times are relatively quick
- Reduced human presence and impact on the landscape
- Cost effective

Future Use/Needs

- Determine the number of audio/video systems needed to adequately sample 840 x 105 m grids to directly compare with trapping surveys
- Demonstrate that these systems and techniques effectively detect MGS across its range under varying conditions
- Utilize these systems to locate future trapping locations to improve the cost-effectiveness of trapping surveys
- Investigate food preference to possibly improve trapping success
- Investigate how ground squirrels interact with traps to possibly improve trapping success

Questions?