

The Electronic Calling System: Effectiveness for Capturing a Wide Variety of Offending Wildlife Species in Nevada, 2002 through 2005

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ABSTRACT: In 2002, a Wildlife Services wildlife biologist from Nevada, a Wildlife Services wildlife specialist from Oregon, and a mechanical engineer from California came together with their ideas about designing an effective and easy-to-implement electronic calling system (ECS). Their common vision was a for a self-contained, user-friendly device that would be highly effective at attracting or "calling in" specific offending individuals of various species to a given location, during a specific time period, and hold them at or near that site for a period of time. Through field trials and modifications, an ECS named the "Chuck Box" was developed. It proved to be an effective self-contained tool, when the correct sound and time combinations were employed, and we describe our success in using it for mountain lions and coyotes. It was especially useful in "anchoring" wide-ranging and/or sporadically problematic animals to a site where control tools could easily be utilized or wildlife damage management actions could be initiated. In 2004, non-wildlife sounds were added to the memory card of the unit, making the Chuck Box also function as an effective non-lethal scare device. Thus, the Chuck Box can provide non-lethal harassment or provide support during lethal wildlife damage management activities. Field results indicate that the Chuck Box can be highly effective in increasing capture success, holding animals in the proximity of the station, and in deterring various wildlife species.

KEY WORDS: auditory stimuli, *Canis latrans*, Chuck Box, coyote, electronic calling system, lethal, mountain lion, non-lethal, *Puma concolor*, wildlife damage management

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INTRODUCTION

Electronic calling devices have been around for a number of years, both as commercial versions (used by many predator callers and sportsmen), and as electronic call boxes used by USDA Wildlife Services. Commercial electronic calling devices are operated directly by the user, while a call box is timed and operates independently for a period of time.

Early call box versions utilized an automobile cassette radio with a public address speaker, powered by an automobile battery. Such units were activated by a photo cell when darkness arrived, and duration of play was controlled by an irrigation system timer. The internal components were housed in a heavy plywood box, making the whole system about 40 lbs in weight. These early units were vulnerable to moisture, rough handling, and rodent damage when left in the field for extended periods of time. Cassette tapes had a tendency to break or malfunction during extreme cold and hot weather. The concept was there, but the technology needed further advancement to ensure reliability and effectiveness.

Nevada Wildlife Services wildlife biologist Jack Spencer, Jr. and Oregon Wildlife Services wildlife specialist Chuck Cleland helped put ideas together for an improved system. They teamed up with Martin Lilly, a professional mechanical engineer with ML Designs of Goleta, California, who designed the present electronic calling system, named the "Chuck Box" after professional trapper Chuck Cleland. They had envisioned a more user-friendly device that would be effective at calling in

(or attracting) individuals of various species to a specific location, at a specific time. The device needed to be more durable and lighter-weight than earlier models. The device also needed the capability to be used as a non-lethal sound deterrent. Currently, the Chuck Box is only available to USDA Wildlife Services. In the future, patent rights may be filed for the device.

GENERAL DESCRIPTION

The Chuck Box was designed to accept programmable input and output control, and it was designed for outdoor, stand-alone applications for situations where it is not always feasible to have an operator present. It has built-in, high-powered speakers for the projection of sounds that are stored on a removable compact flash MP3 media card (see Appendix).

The Chuck Box can automatically emit sounds, turn on outputs, and monitor inputs (inputs and outputs are factory-installed options and may not be installed on all units). The device can be programmed to automatically play various sound sequences at selected days and times. The operator programs the device in advance, using a sequence programming structure that is controlled by a real-time military clock. Control features also allow a person to operate the device locally in real time (without programming), using keypad inputs on the control module. A remote control allows activation and programming from a distance of up to ½ mile, depending on the environment.

The external enclosure is made of rugged plastic. The

lid has a locking hasp and a carry handle. The device sports two long-range, waterproof projection horn speakers, oriented out both ends of the box. The internal battery is a rechargeable lead acid unit. Each call box comes with two batteries, so that when one is operating the device, the other can be recharging. A battery-check switch on the control module tells the operator when a battery is low. The Chuck Box can usually operate for a 2-week period on one charge, but more frequent play times will shorten the maximum operating period.

The controller module is in a small aluminum box located inside the external enclosure, which contains the "brains" of the unit. It has a liquid crystal display (LCD) that shows the unit's current status and allows the operator to see the parameters being set during programming as well as the current playback status during operation. The power switch, battery check switch, and keypad are all located adjacent to the LCD. A speaker select switch allows the use of one or both speakers; using one speaker draws less power than two, giving longer battery life in situations where multidirectional sound projection is not required.

Using the keypad on the control module, the operator can program the unit to broadcast a unique series of sounds and pauses arranged in any order and of varying durations; this is called the "playback sequence." The unit's available sound files that are stored on a MP3 memory card that can hold up to 240 sounds (81 sounds are currently available). There are two independent start and stop times for any pre-programmed sequence. The days of the week for the playback of a stored sequence are also programmable. For example, play can begin at 1700 hrs (5:00 pm), stop at 1900 hrs (7:00 pm), begin again at 0500 hrs (5:00 am), and stop at 0700 hrs (7:00 am) on Monday through Friday, and not play at all on Saturday and Sunday. This programmable sequence allows the Chuck Box to be active during optimal times for the target species, and be silent during vulnerable periods when the public could find and vandalize or steal the unit.

DISCUSSION

Mountain Lions (*Puma concolor*)

The primary use of the Chuck Box thus far has been for the capture of mountain lions that prey on translocated bighorn sheep (*Ovis canadensis*) in remote areas. Translocated bighorn sheep often are not familiar with their immediate surroundings, and feeding, watering, and escape routes are not yet known to them. This "vulnerable period" is exploited by predators such as mountain lions, which are effective at finding and consuming translocated bighorn sheep. Each relocated bighorn sheep is worth \$2,500 to \$5,000, so each is a valuable wildlife resource that needs protection from predators.

Prior to the start of any new bighorn sheep relocation project, a "trigger switch" or "starting mechanism" should be implemented to provide guidance for initiating wildlife damage management (WDM) activities, as well as predicting the consequences of not providing WDM work (Spencer 2004).

By pairing the Chuck Box with the use of 3/32-in, 9-

ft, 1 × 19 cable trail snares, the combination provides for an effective, 24/7 tool. Because of the remoteness of the locations where the Chuck Box has been needed, trail snares were much easier to pack, and they were much easier to maintain than leghold traps (Bowers 2004). Other ground tools, such as leghold traps and foot snares, could also be used as capture tools around the calling system. The Chuck Box "pulls" mountain lions away from the protected resource and acts as a lure crop. By placing the Chuck Box at a site not frequented by, but adjacent to, areas where there are protected animals, it is possible to both lure the offending animals away from the resource and reduce the chance of a non-target catch. WDM activities also appear to have a positive residual effect, experienced by livestock producers, following the end of wildlife resource protection efforts (Spencer 2004).

Trail snares are placed in concentric locations surrounding the Chuck Box as landscape and vegetation allow. Open areas can be "brushed off" to funnel mountain lions into trail snare sites for capture. Trail snares may be set as close as 15 ft from the box to as far out as ¼ mile, depending on the terrain and trail systems. Trail snares are not recommended to be placed any closer than 15 ft, or the captured animal may destroy the Chuck Box while captured.

It is suggested by one of the authors (JOS), based on his experience, that the area around the call box be saturated with trail snares (or other types of equipment), as the targeted mountain lion often comes to the Chuck Box only once and may not return again. Because there are a multitude of different mountain lion sounds in the Chuck Box, it is recommended that if a targeted mountain lion inspects the Chuck Box and is not caught, then a different mountain lion sound and sequence should be programmed for a second attempt to capture the mountain lion.

Sound sequences of mating mountain lions (or other mountain lion vocalizations) work especially well for attracting large, older territorial males. These sequences also seem to work for "scaring off" other wildlife species that may wander near the area while the unit is operating. This is especially helpful in reducing the likelihood of non-target catches. The average mountain lion catch distance has been 36.6 m from the device, with the closest mountain lion captured at 8.2 m. These average catch distances are based on 22 mountain lion captures by B. A. Miller, J. Peter, and J. O. Spencer (unpubl. data, 2005). Because mountain lions have large territories, especially in arid areas such as Nevada, they may only move through some areas a few times a year. Often, Chuck Boxes can be set in the field for months before a mountain lion is captured, because of limited food availability and mountain lion movement in fragile desert communities.

Coyotes

A wide variety of recorded vocalizations work well for locating coyotes (*Canis latrans*) during aerial operations and during "howl surveys" for coyote population estimates. Coyotes appear to howl better in response to a recorded group howl than to a lone coyote howl or a siren sound. The Chuck Box can be used for stand calling, and

the operator can place the unit a few yards away, thus enabling the Chuck Box to draw the incoming animal's attention to the sound and not to the operator. Use of the remote can extend this separation between the operator and the unit, allowing more control over sound playback during manual calling operations. The Chuck Box is also a very useful tool for new employees who do not have calling experience and are required to remove problem animals.

Aerial Hunting

The Chuck Box has been showing great promise as an aerial hunting tool. It can be placed out days or hours prior to aerial hunting an area, and it can be programmed and activated from the ground, or for units equipped with the remote option, from the air. The unit can be used to "call out" coyotes from rugged or brushy terrain into more open areas that are better suited for aerial hunting. Once the Chuck Box has been operating for 30 to 60 minutes, the air crew can scan the area for coyotes drawn into the vicinity and subsequently remove them. This new method of aerial hunting will probably work for other species as well. Using the Chuck Box in this manner can provide savings of both fuel and time for aerial operations, as well as improve safety for the aerial hunting crew.

Other Species

Raccoons, ravens, wild hogs, foxes, and feral dogs are just a few of the species that have been called into the Chuck Box. USDA WS personnel believe that almost any avian or large mammalian species can be called into close proximity to the Chuck Box with the correct combinations of sounds and sequences. To date, every species that the Chuck Box has been tested on has reacted in some obvious manner to the sounds.

CONCLUSION

Additional field research is needed to see what other avian and mammalian species can be called into the unit, and what other "scary" sounds can be implemented to repel problematic wildlife. The USDA National Wildlife Research Center (NWRC) has recently purchased several of the units in order to examine their effectiveness and various animals' behavioral responses. NWRC will also distribute several Chuck Boxes to professional field personnel to test the units and validate their effectiveness.

ACKNOWLEDGEMENTS

We thank everyone who spent countless hours of unpaid time inventing, developing, and testing the Chuck Box. These are the individuals that help make the Wildlife Services program so successful. We also owe a "big thanks" to Martin Lilly for manufacturing the units.

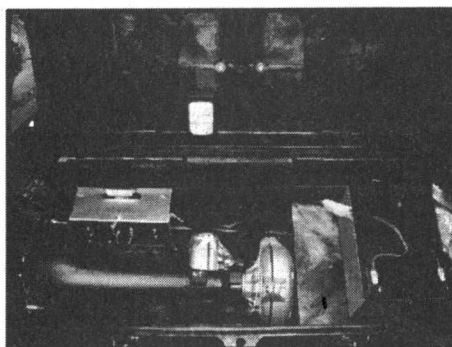
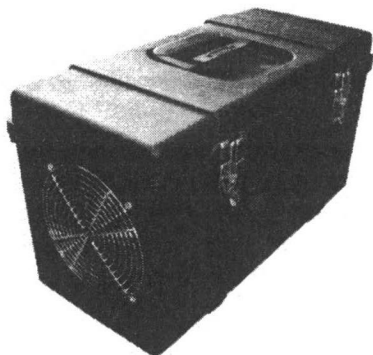
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ML Designs

Digital MP3, programmable, Long Range Prototype Call Box Unit
on the web at: www.varmitbox.com

"Chuck Box" NEVADA Style Call Box

Systems are custom built in the USA. We designed this unit for use by the Nevada USDA-APHIS (Jack Spencer , USDA-APHIS Wildlife Services, Reno Nevada) program to lure in predators from long distances. These systems are custom built based on the users requirements for weight, portability and predator type or application. System weight, 21 pounds (may vary depending on configuration). Size 20"L x 8.75"W x 10.5"H, Heavy Duty Plastic. The design is not limited to this configuration. It consists of a Dual Speaker capability for 180 degrees of sound projection, a 12 Volt, 12 amp hour battery, Microprocessor control module with manual keypad for programming and playback control, rigid plastic two hasp enclosure with carrying handle. Optional Remote control unit also available. This unit has been very effective for the Nevada program. It is a variation of the original design for Chuck Cleland, of the Klamath Falls (OR) USDA-APHIS Wildlife Services division. Due to the effectiveness of these units, we currently offer these units only to USDA-APHIS personnel, as per request by USDA-APHIS officials. End user references can be supplied.

Speaker(s): 250watt, 8 ohm, weather proof driver(s). SPL of 107dB. Single or dual speaker playback select switch. Long range projection horn for maximum distance and quality sound.

Power Supply: 12 volt, 12 Amp hour valve regulated Lead Acid (Gel Cell) battery with 110VAC automatic float regulated charger. Extra battery available for easy swapping into the unit when battery needs to be recharged.

Control module: Microprocessor controlled MP3 player unit. The sound file Memory card is removable/interchangeable Compact Flash. Operator can program any sequence of sounds stored on the memory card to playback as desired for a selected duration. Operator can mix the sound order, insert pauses and select two independent on/off times for sound sequence playback. Operator can check battery reserve by depressing a toggle switch on the unit. LCD Display indicates system status at all times and displays all steps in the programming sequence for ease of programming. All inputs are made via a touch keypad on the front of the control module just below the display. Volume is controlled there as well. System has internal clock (Military time) that controls playback sequences when unit is placed remotely and left for weeks at a time. Time is also displayed in the LCD.

Optional Remote control Unit: Remote Control transmitter module with remote control receiver . Current range 1/2 mile +/- depending on the environment.

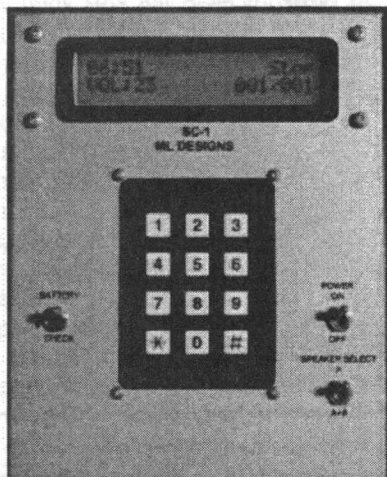
See Page 2 for current option selections, call for Price quote.

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MP3, programmable, Long Range Prototype Call Box Unit

ML Designs on the web at: www.varmitbox.com



Close-up of control module

"Chuck Box" NEVADA Style Call Box

Due to the customized construction of these assemblies, please contact ML designs for a written detailed quotation. The following is a list of typical options to consider for this Nevada Style arrangement. Think about what you want/need and let us know. Additional ideas and options can also be considered

* Due to the sensitive nature of these systems and their application, currently, these systems are only available to USDA-APHIS Wildlife Services Personnel Subject to change *

Speaker(s):

2- Long Range Projection Horn and weather-proof driver assemblies with protective grill and diamond mesh shield. (two speakers are standard on these units)

Compact Flash Memory Cards:

32Mb (capacity for approx. 25 individual current sounds) , 64Mb (capacity for approx. 65 individual current sounds) , 128Mb or 256Mb (capacity for approx. 90+ individual current sounds). Card availability can fluctuate depending on supplier stock at the time of order. Larger cards can be ordered any time and all sizes simply plug into the end of the control module.

Sounds:

This unit will play any sound that can be recorded, it simply needs to be in the popular MP3 file format .

Power Supply:

12V, 12Ahr DC Gel Cell SLA battery with Fast/Float Charger unit (we have been getting over 2-weeks of battery life from these units with both speakers playing at approx 80% volume adjustment, with 40-60sec of sound playback, 3-4 times per hour, for 12 hours a day, longer if a single speaker is active).

Extra 12V, 12Ahr Gel Cell Battery typically purchased to allow access to a back-up unit while the other charges.

Control module:

Module with LCD, Keypad and control switches, wired into system. Can control up to 240 different sounds from a sound card.

Optional Remote control Unit:

Remote Control transmitter module with remote control receiver . Current range 1/2 mile +/- depending on the environment

Optional Switching Inputs and / or outputs

The unit can be commanded to switch on devices and or it can be configured so that the unit will respond to switch closures on any of the optional inputs. Contact ML Designs for more details on these options.