The Sound of Silence

Minimising noise disturbance when managing feral animal populations
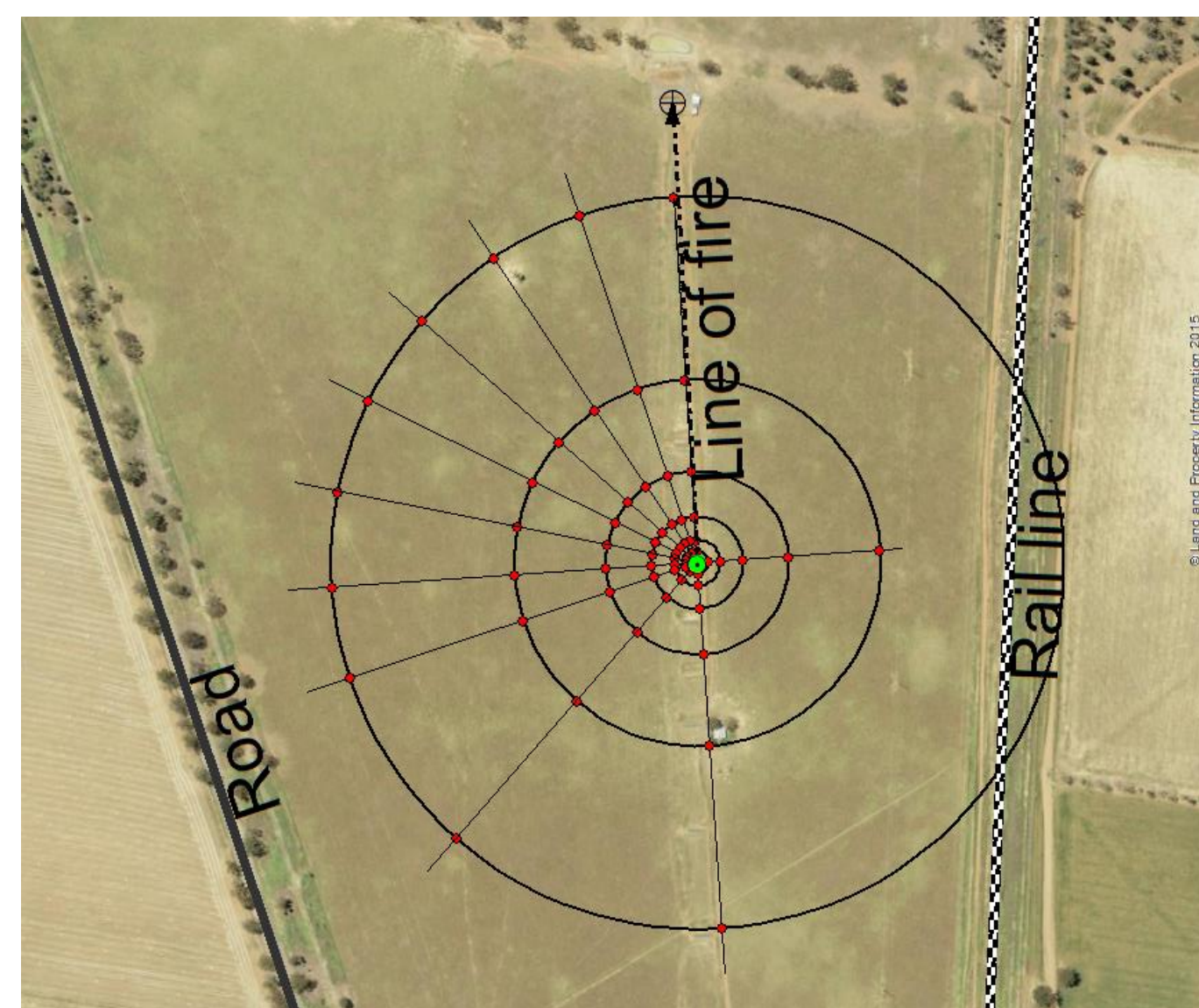
Adam McSorley [1], Grant Eccles [1], Rob Hunt [1], Dr Warwick Williams [2]
1. NSW National Parks and Wildlife Service, Pest and Weed Unit   2. Australian Hearing Hub

Introduction

Supressing noise with the use of a silencer will reduce the muzzle blast but not the sonic crack when using high velocity ammunition. By attenuating the intensity of the noise the disturbance to nearby pest animals may be reduced, thereby increasing the number of pest animals that can be targeted and increasing the cost effectiveness of ground shooting operations.

We aimed to increase the effectiveness of silencer use in pest animal management by identifying at what angle and distance the noise from a suppressed firearm is significantly reduced.

Two primary sources of sound

Muzzle Blast
Produced by expanding, hot gases from the propelling charge at their exit from the muzzle.

Sonic Crack
The sound of the projectile breaking the sound barrier. This is only heard in front, and to the side of the projectile.

Fig 1. Sampling Point Layout, Dubbo-Narromine Rifle Range, NSW

Methods

Location: This study took place at the Dubbo-Narromine Rifle range

Measurement: Measurement points (red dots) were located along 9 angles and 5 distances (10 – 320m) from the shooter. At least 3 measurements were taken at each measurement point with both silencer on and off. *See Figure 1.*

The maximum, C-weighted peal level (L_{Cpeak}) was recorded from each shot. This is a common measurement when examining the effects of noise. This was measured with precision sound level meters (Casella CEL-63x - high range microphone).

Firearm: .308 Styer SSG Carbon bolt action, AAC 7.62 cyclone direct thread silencer, using Federal Speer 130 grain, hollow-point projectiles.
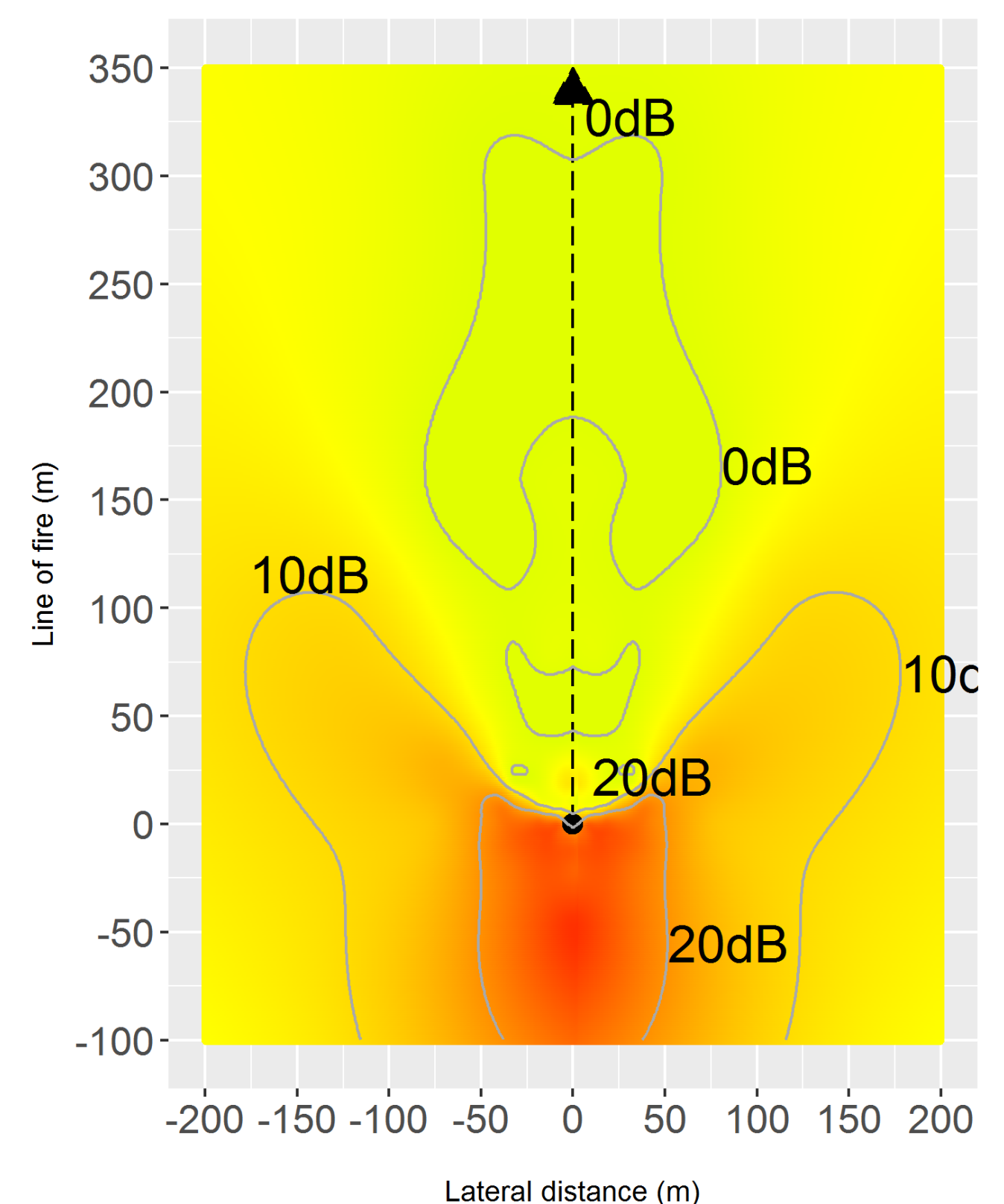
Data Analysis: Results from generalised additive models using statistical software R was used for data analysis and for creating heat diagrams (Fig 2 and Fig 3).
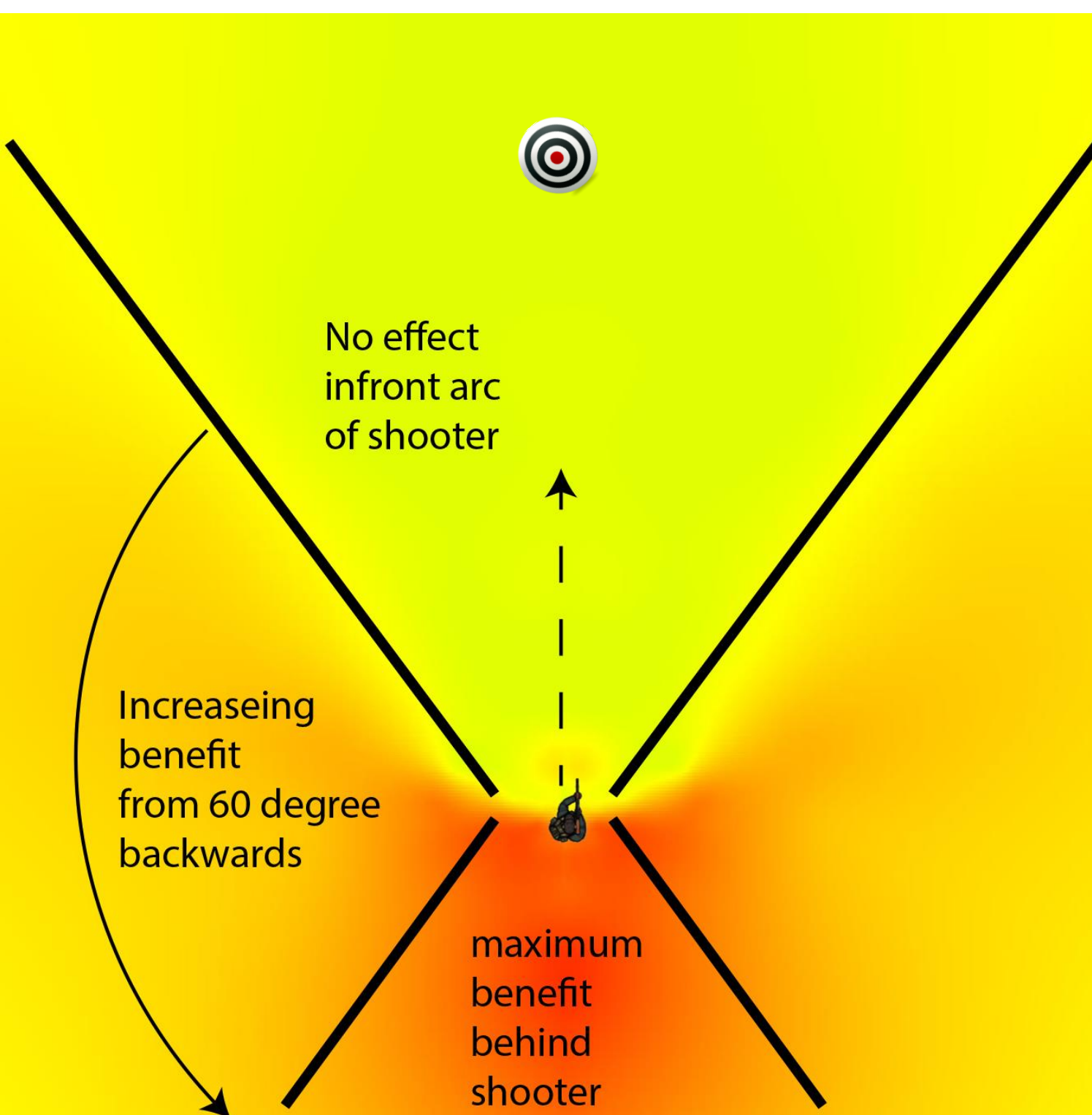
Results

Forward of shooter: Measurements taken along the line of fire showed consistent results with no difference between supressed and unsuppressed shots using high velocity ammunition.

Side of shooter: As the angle from the line of fire increases the difference between supressed and unsuppressed shots begin to increase. However, this difference is negligible until reaching approximately 60° from the line of fire. The difference continues to increase with a large difference at 90° and maximum difference directly behind the shooter.

Fig 2. Illustration of where the practical benefits of silencers are.

Fig 3. Peak noise reduction in 10dB steps (see contours) highlighting the reduction each side and to the rear of the shooter. The arrow indicates the line of fire.

Fig 4. Sound level meters and shooting position at Dubbo-Narromine Rifle Range.

Conclusion

The requirement to use silencers should be reviewed in relation to the objective of the shooting operation. Where the primary objective is to target a single animal or specific individual within a herd species (e.g. hunting for meat or trophy, for genetic sampling, removal of a rouge individual or for humane destruction of an injured or sick animal), use of a silencer does little to enhance the effectiveness of the activity. This is due to the noise level disturbance or sonic crack experienced down range being identical when using high velocity ammunition with or without a silencer fitted to the firearm. Where the primary objective of a shooting operation is to target multiple animals across a control area, use of a silencer is likely to result in an increased number of shooting opportunities due to reduced noise level disturbance to animals adjacent to and behind the shooter.

Reference: Williams, W., McSorley, A., Hunt, R. and Eccles, G. (2018) Minimising noise disturbance during ground shooting of pest animals through the use of a muzzle blast suppressor/silencer. Ecological Management and Restoration.