

# APPENDIX N

SAFETY ZONES FOR  
RECREATIONAL TARGET SHOOTING

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### **IDENTIFICATION OF SITES WITH SHOOTING RESTRICTIONS**

Las Cruces District Office Supplemental Rules (Federal Register, Volume 60, No. 218, page 57014, FR document 95-27596) prohibits the discharge of firearms within ½- mile of developed recreation sites and areas. If recreational target shooting is allowed at or near developed recreation sites and areas, unintentional bullet ricochets or misfires would present an unnecessary risk to public safety (see analysis section below).

The BLM identified the following developed recreation sites in a mapping exercise, then overlaid a ½-mile buffer. The recreation sites and areas are designated trails, associated parking lots, campgrounds, and special recreation areas. The sites and buffer were then described in aliquot part (Table N-1).

The differences between game hunting and dispersed recreational target shooting create different safety issues for either activity. Hunting is a regulated sport in which the following is controlled: season, number of permits, target (animal), number of harvested animals, specific weapon, safety training, and location. Dispersed recreational target shooting is not a regulated sport. For dispersed recreational target shooting there are no controls on location (such as hunting units), time of year, target, choice of weapon, and safety training.

Hunting normally only uses a very small amount of ammunition per person, but often recreational target shooters will use a large amount of ammunition in a very short period of time. Hunting occurs away from people, residences, and in the backcountry while dispersed recreational target shooting regularly occurs in the most readily accessible places (near neighborhoods, roads, etc.). While both sports use weapons; safety, location, intensity, and regulations are the key factors differentiating the two activities. Any closure of public lands to hunting or dispersed recreational target shooting would be for public safety.

### **WEAPONS DISCHARGE ANALYSIS**

Recreational target shooting contains many hazards based on predictable projectile physics and unpredictable human behavior. The following information depicts industry standards for predictable projectile physics, given a single point of weapon discharge. These standards are used during construction of safe shooting ranges. Surface Danger Zone (SDZ) is a depiction of the mathematically predicted area a bullet will return to earth by direct fire (Gun Target Line or GTL) or ricochet.

**TABLE N-1**

AREA	ACRES CLOSED TO DISCHARGE OF FIREARMS <sup>1</sup>			
	ALTERNATIVE			
	A	B	C	D
<b>Dripping Springs Natural Area</b> T. 23 S., R. 3 E., Sections 1 and 2; T. 23 S., R. 4 E., Section 7.	5,160	5,160	5,160	5,160
<b>Aguirre Spring Campground</b> T. 22 S., R. 4 E., Section 29	2,325	2,325	2,325	2,325
<b>Three Rivers Petroglyph Site</b>	1,850	1,850	1,850	1,850
<b>Kilbourne Hole below rim</b>	815	815	815	815
<b>Lake Valley Historic Site</b>	190	190	190	190
<b>Dog Canyon Road</b> , Otero County, New Mexico (public land in section 17, T. 18 S., R. 10 E.)	No Decision	200	200	200 <sup>1</sup> Hunting allowed
<b>Doña Ana Mountains SRMA</b>	Open to hunting and target shooting	7,600	3,145  Closed in: Section 31, T. 21 S., R. 2 E. Sections 5, 6, 7, and 8, T. 22 S., R. 2 E. Sections 1 and 12, T. 22 S., R. 1 E.	7,600 <sup>1</sup>  Hunting allowed
<b>Permian Tracks Road</b> NW¼NW¼, Sec. 29 and N½NE¼, Sec. 30, T. 22 S., R.1 E. and portions of Sec. 19, S½SW¼ Sec. 20, T. 22 S., R. 1 E.  South of Community Pit #1 and the primary entry way to east side of the Prehistoric Trackways National Monument.  Encompasses all of the International Boundary & Water Commission mineral withdrawn area (NW¼NW¼, Sec. 29 and N½NE¼, Sec. 30, T. 22 S., R.1 E. - 120 acres); and S½SE¼ and Sec. 19, S½SW¼ Sec. 20, T. 22 S., R. 1 E.	~100 Public land outside of PTNM in T. 22S., R. 1E., Section 19	~290	~290	~290
<b>Picacho Peak RMZ</b>	No Decision	5,350	5,350	5,350
<b>Sierra Vista Trail</b>	No Decision	15,940	15,940	15,940
<b>Soledad Canyon Trail and Area</b>	No Decision	935	935	935
<b>Baylor Pass Trail</b>	No Decision	2,290	2,290	2,290
<b>Pine Tree Trail</b>	No Decision	850	850	850
<b>Tortugas Mtn. SRMA</b>	No Decision	970	970	970
<b>Tularosa Creek SRMA</b>	No Decision	N/A	N/A	585
<b>TOTAL</b>	<b>10,440</b>	<b>44,765</b>	<b>40,310</b>	<b>45,350<sup>2</sup></b>
NOTES: <sup>1</sup> Includes hunting and dispersed recreational target shooting with two exceptions: Alternative D: Dog Canyon, and Doña Ana Mountains SRMA, would be closed to target shooting but open to hunting. <sup>2</sup> Total acreage closed to target shooting but open to hunting is 7,800 acres.				

## PROJECTED AMMUNITION CAPABILITIES

Standardized industry tables exist identifying a host of variations in Distance X, Distance Y, and Distance W for different calibers, types of bullets, and powder charges resulting in a wide range of variability in SDZs. Distance X provides for the maximum distance along GTL that a projectile will travel. Distance Y provides the depth of ricochet area along the GTL and likewise is not a significant concern because most likely the target location is against a hillside. Distance W defines the ricochet area width where uncontrolled projectiles can place the public in harm. However, Distance W is the dominant factor when considering target shooting on public land near developed recreations sites or areas where the public congregate for extended periods of time. Distance W varies from 1/16-mile for the .45 caliber to ½-mile for the 7.62 or .30 caliber, which is North America’s most common rifle caliber. Table N-2 identifies distances, in meters, used to construct a typical SDZ for commonly used calibers and factory ammunition.

<b>TABLE N-2</b>				
<b>SDZ ELEMENT DISTANCES, IN METERS</b>				
<b>Caliber</b>	<b>Distance X</b>	<b>Distance Y</b>	<b>Distance W</b>	<b>Distance W + Area A</b>
.22 long rifle	1400	1125	386	404
9 mm	1800	1211	399	579
.38	1806	1258	389	569
.45	1690	1111	290	470
5.56 (or .223)	3437	2029	462	642
7.62 (or .30)	4100	4053	861	1041

## RICOCHE AREA

The types of ammunition, targets, and firing activities dictate SDZ dimensions. A basic SDZ consists of three parts: impact area (dispersion area), ricochet area (Area W), and secondary danger area (Area A and Area B) (see Figure 1). The primary dispersion area established for the impact of all rounds extends five degrees to the left and right limits of weapon discharge and downrange to the maximum range of the ammunition (Gun Target Line or GTL) used. The ricochet area lies to both sides of the dispersion area and extends downrange to the maximum distance of the ammunition used. The ricochet area contains two angles determined specifically by the type and caliber of ammunition being fired. This analysis assumes the following: a single firing point, compliance with shooting safety protocol, using a hillside for a target backdrop, predictable human behavior, and no steel targets. Any of these assumptions, when violated, could greatly increase distance and negate the previously described SDZ. Distance W plus Area A identifies a secondary danger area with decreasing probability of receiving a projectile or debris. This secondary danger area is that area paralleling and 90 meters outside of the outermost limits of the ricochet area and extending downrange to the maximum distance of any ammunition used.

## CONCLUSION

The development of SDZs is used primarily for the construction and management of outdoor shooting ranges, but the BLM used this data to determine a safety zone around areas where the public congregates. In regards to the most common North American rifle caliber, the maximum Distance X for a .30 caliber is approximately 2¼-mile although typical target shooting occurs at distances of 25 to 100 yards. Typically, shooters use hills for backstops and identify their targets so the Distance X is not the main concern regarding target shooting on public land around developed recreation sites or areas where the public congregate. However, this technical data is used to synthesize a practical definition of a rectangle entailing a 2¼-mile by ½-mile SDZ for the most commonly owned rifle caliber. Again, the greatest concern for an area used for target shooting would be the ½-mile lateral deflection or ricochet area.

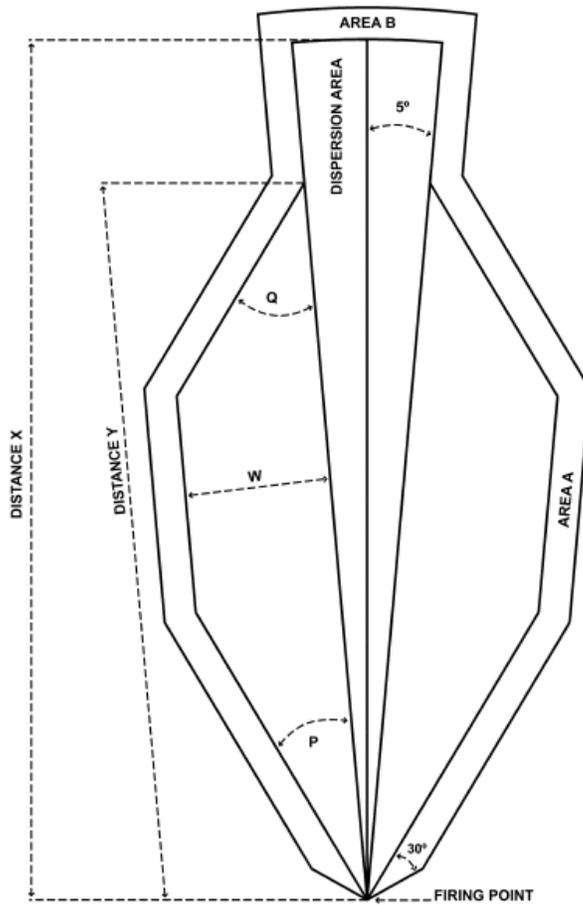


Figure 1 Batwing surface danger zone (SDZ) for firing small arms direct-fire weapons.

**Distance X:** maximum distance along GTL that a projectile will travel.

**Distance Y:** maximum distance downrange of which a lateral ricochet is expected to occur when a projectile is fired given elevation.

**Angle P:** beginning angle for the ricochet area measured from the firing point downrange along the edge of the dispersion area.

**Angle Q:** angle measurement downrange, beginning at distance Y along the edge of the dispersion area.

**Distance W:** distance between the outside edge or border of the ricochet area and the outside edge or border of the dispersion area on the SDZ.

**Area A:** identifies a secondary danger area with decreasing probability of receiving a projectile or debris

#### REFERENCES:

1. Department of Army Pamphlet 385-63. Range Safety. 30 January 2012.
2. Range Design Criteria. US Department of Energy-Office of Health, Safety and Security. 18 November 2008.
3. USMC Range Safety Pocket Guide-Version 1.0. Full version of MCO 3570.1B and DA PAM 385-63.