

Report Highlights

Do Shotguns and Muzzleloaders Pose Less Risk Than Centerfire Rifles for Hunting Deer in Pennsylvania?

House Resolution 61 of 2005 called on the LB&FC to study the relative safety of shotguns versus rifles for hunting in Pennsylvania and whether special regulation areas should be expanded. Due to the nature of this topic, the LB&FC contracted with MountainTop Technologies, Inc., for this study.

Findings:

- **Decisions to ban rifles for hunting are primarily based on the public perception that shotguns are less risky than rifles, rather than sound scientific data.** Many states, including Pennsylvania, ban hunting with rifles in at least some areas of the state. None of the states contacted, however, were able to provide scientific data to support the contention that shotguns are less risky than centerfire rifles.
- **The PA Game Commission collects data on incidents where stray bullets strike personal property.** Beginning in 1998, the PGC has been collecting statistical data on all hunting-related shooting incidents in PA where a stray bullet has struck personal property. Through the end of 2005, data was collected on 464 such incidents: 75% involved rifles, 21% shotguns, and 4% muzzleloaders. Incidents tend to cluster in suburban Philadelphia, south-central PA, and the Lehigh Valley. This information should not be interpreted to conclude that one firearm-ammunition combination is riskier since there is no means to compare the corresponding rate of incidents based on the number of hunter firearm discharges.
- **At a 0° firing angle and taking ricochets into account, some widely used shotgun-ammunition combinations are riskier than centerfire rifles.** The relative risk of shotguns versus rifles depends on the ammunition and angle at which the shot is fired. At elevated angles (35, 10 and 5 degrees), modern high velocity sabot shot slugs¹ travel shorter distances and therefore are less risky than many common centerfire rifle-

ammunition combinations. However, when fired at approximately 0° (i.e., a hunter firing at a deer on level ground), the same 12 gauge shotgun-ammunition combinations were found to be more risky than .30-06 rifles because the modern shotgun slugs tend to travel further after ricocheting than rifle bullets. This is because, after hitting the ground at shallow angles of impact, rifle bullet ricochets tend to tumble in flight, creating a high drag, whereas shotgun slugs maintain more of their energy and aerodynamic properties and therefore travel further. In all cases, muzzleloaders were less risky than both rifles and shotguns.

	<u>Elevation</u>			
	<u>35°</u>	<u>10°</u>	<u>5°</u>	<u>0°</u>
Rifle.....	2.64	2.03	1.66	.92
Shotgun.....	1.97	1.54	1.30	.99
Muzzleloader....	1.74	1.36	1.14	.85

- **Reduced ricochet projectiles, should be investigated as an alternative for managing risk.** While the suitability of these projectiles for hunting deer is unknown, these projectiles are designed to break apart upon impact and would therefore increase safety.

Methodology:

- An empirically tested computer model was used to find the total distance (including the ricochet) the projectile travels for representative firearm-ammunition combinations suitable for deer hunting. The model was developed by the U.S. Department of Defense for small arms firing range safety determination and model runs were made by the Army's Armament Research, Development and Engineering Center.

¹Shotguns used for deer hunting use solid lead slugs, not cartridges filled with small pellets. Early shotgun slugs were round "pumpkin balls." Modern slugs are short, blunt lead bullets that are rifled to impart a spin.