

# *Range Evaluation Report*

**Project #: NV20190103**  
**Subject: Carson City, Nevada Range**

**LATE MATERIAL**  
**Item # 24B**  
**Meeting Date: 1/17/19**

**Date: January 03, 2019**

## **STATEMENT REGARDING INFORMATION IN THIS REPORT**

Nothing in the information that follows should be considered “requirements” of the NRA or Tactical Services Group. The informational items are “suggestions”. The range operator may or may not choose to act upon any or all of these suggestions. It should not be interpreted by anyone that a failure on any part of the range operator to accept and/or implement any of the suggestions set forth herein as evidence of a “cavalier attitude” regarding health and/or safety. A range operator may otherwise be very safety and health conscious without having to resort to any or all of these suggestions.

Report prepared  
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## ***Range Evaluation Report***

### **Project #: NV20190103 Carson City Nevada Range**

#### **Opening Statement**

On January 2, 2019, I conducted an on-site Range Inspection of the Carson City Rifle and Pistol Range located at 4000 Flint Drive, Carson City Nevada 89701. This inspection was conducted at the request of Jennifer Budge, Director, Carson City, Parks and Recreation & Open Space. This inspection focused on range design, safety procedures, operations and potential projectile escapement of the entire facility.

My observations and subsequent conclusions listed in this report are based on the range configuration as I observed it on January 2<sup>nd</sup> and does not take into account any configurations or previous shooting designs that were in place before my inspection. My conclusions are based on the range design that I was able to evaluate and inspect.

Specific elements of the inspection as requested are listed below.

Determination of the following:

1. The overall safety of the design of the range including, but not limited to:
  - Proper construction and placement of berms and backstops
  - Proper area for the Surface Danger Zone
  - Proper procedures in place for when the range is active (hot) or inactive (cold)
  - Measurements to correspond with analysis
  - Does the range meet the guidelines outlined in the 2012 *Range Source Book* which is the most recent version published?

2. Note any areas that are found not in compliance.

3. At client's request, I evaluated 6 shooting Bays. These bays were identified by the names Long Range, Short Range and Secondary Pistol Bays known as Shooting Bays 1 through 4. The long range bay accommodates shooting to 300 yards and consists of 20 covered and 20 uncovered shooting positions. The Short range accommodates shooting to 50 yards and consists of 20 covered shooting positions. The Shooting bays accommodate shooting out to 50 yards. These bays do not have designated shooting positions and vary in width. Bays 1 and 2 are approximately feet 45 feet wide, bay 3 is 55 feet wide and bay 4 is approximately 65 feet wide.

The basis for my evaluations and inspections are in accordance with the National Rifle Association's *Range Source Book* dated January, 2012. (***This source book is NOT a certification guideline or specification resource. The NRA does NOT certify or in any way approve ranges or range design for any purpose.***)

There is no shooting allowed on this range from any moving vehicles or airborne platforms. Therefore, I did not consider any other publications, such as military range regulations or Department of Defense or Department of Energy regulations as they have no bearing, jurisdiction or relevance to this range.

## Summary

The range is a city park shooting facility located in a mostly rural brushy terrain area zoned "Public Community Use". (See fig. 1) The range property is under the control of the Carson City Parks and Recreation Department but the range is operated by the non-profit Carson Rifle and Pistol Club through a land use agreement. Reasonable accommodations for the safety of both those using the range and the general public are achieved by considering the entire context in which this particular facility is operated. The type of shooting conducted, the rules and controls that are practiced, the overall design of the range, and the surrounding environment must be considered.



Figure 1

## Background

This facility has been in operation at this location in one form or another since 1982. The range is located in what I would consider a rural area within Carson City, Nevada. This range accommodates large and small bore rifle and pistol shooting to include black powder and shotgun.

## Observations

### Current Range Control

The Club exercises operational control over the range at several levels. In coordination with the City Parks and Recreation Department it sets limited hours of operation and requires users to access the shooting bays only during the posted hours of operation. Range rules and regulations are posted at various locations across the property. Patrons not associated with the club have full access to the facility when it is open to the public. There is no requirement for patrons to attend any orientation or safety briefing prior to accessing the facility. This facility has operated for years as an open access non supervised/controlled firing line range during hours of operation.

Non controlled firing line ranges are not uncommon and can be found operating safely across the country. However, the overall safety of such facilities is often a result of specific range access policies and procedures that are not presently required at this facility.

Range access is controlled by the locked gate and limited to the posted hours of operation. The road access to the facility is adequate and leads directly to the ranges. (See fig. 2)

### Current Design/Safety

In addition to the overall inspection of the facility, I also looked specifically at the possibility of projectile escapement from the outdoor shooting bays. It was noted that the facility experienced 3 brush fires this past year. All the fires were beyond the established shooting bay boundaries.



Figure 2

### Outdoor Ranges Overview:

The overall layout of all the facility and the shooting bays inspected is good. The ranges with overhead covered shooting stations are very well made. The construction of these shelters is above average. The concrete pads and the shooting benches are also first class. There is limited signage at or near the firing line that emphasizes the safety rules and the expected behavior of the shooters while shooting activity is taking place.

The facility is not perimeter fenced or posted with signs indicating the presence of a shooting range. There is a solar powered control gate located on the main access road into the facility. There is obvious evidence of ongoing unauthorized access to the property by makeshift 4x4 type trails that defeat the access gate. Fencing is the upright barrier that, once installed, serves as a barrier to range entry except through a designated

point. Gating is the entrance through the fence at the designated ingress-egress point. The gate system in use now is well constructed and operational.

Some ranges have terrain around their entrance and perimeter that can prevent outside entry. Other range operators have to fence the entire perimeter of their property. It appears that there may be multiple areas surrounding this range facility where the terrain features would provide an appropriate access barrier and eliminate the need for a fence covering every square foot of the perimeter.

Fences and gates at shooting ranges control access to the range. Virtually every shooting range is required to possess liability insurance, whether operating as a commercial business or a non-profit entity, in the event that there is an injury on a range facility. To go along with that liability protection, each range operator's responsibility is to maintain a level of security at their range, protecting their investment, keeping out vandals, also limiting operating hours and range safety. If operating hours are violated, this could result in range closure, so a limit to access ensures both the safety of the range, and neighbors of the facility.

This particular site is well laid out, located on rolling hills with ravine like features. It appears the range was positioned to make the best use of the terrain in an effort to control projectile escapement and minimize construction costs. The original developers effectively utilized the natural terrain in their layout.

Communication between the various shooting bays and emergency notification off property is not available by land line phones. There is limited cell coverage at the property.

#### Projectile Escapement Issue:

It is clear that projectiles are leaving this facility. It is not entirely clear if this is occurring as a result of improper containment design/construction, shooter behavior or a combination of both. My opinion is that bullets are leaving the property as a result of both factors.

*\*\* The range design/construction issues will be listed separately and specific to each bay, in this document.*

Like "safe highways", "safe ranges" are the result of a combination of engineering design features, rules for use, control, and personal user responsibility. Similarly, even when all these elements are in place there is no absolute guarantee that an accident will not occur. Range safety is a context driven exercise in responsible risk management.

There have been numerous complaints from the Carson City landfill employees of projectiles impacting their work areas. In fact many rounds have been collected from the land fill property. The majority of the rounds collected have been towards the top of the ridge above and between the South monitoring well and the tipper location.

During my inspection of the landfill area between the South monitoring well and the tipper location it became clear to me that this area is well within the distance and path of bullets that are fired over the backstop. It should be noted that shooting over the backstop is possible in many ways such as improper shooter behavior, poor marksmanship fundamentals, and poor range design/construction to mention a few. It is my opinion that given the location of the ridge line between this landfill area and the backstop, bullets hitting the ridge could then continue onto the landfill by ricochet.

The existence of projectile escapement is confirmed not only by the collection of these projectiles and the complaints from numerous landfill employees but by the direct observation from range club members.

Prior to my inspection, club members accompanied by City Public Works staff collected numerous bullets from the referenced landfill area during shooting activity at the range on November 18, 2018. The club members had established communications with the RSO at the firing line who confirmed the shooting locations and direction of the ongoing shooting activity. In talking with the club members and the City staff it is clear that they are certain the projectiles heard “whizzing” overhead originated from the range. They also indicated that the rounds heard were more than likely ricocheted as they did not hear the “crack” normally associated with a rifle round as it passes overhead. See Appendix A for an aerial view of the group’s findings.

*Note: Ricochet vs. Direct Fire Considerations. Range design professionals typically use a 300 yard ricochet zone (best practice) as a safe distance to account for projectile ricochet containment. This design consideration assumes the projectiles are not impacting any surface/ground beyond the backstop before beginning the ricochet. This distance has been effective in accounting for or preventing deflected bullet escapement in numerous outdoor rifle and pistol ranges. The 300 yard measurement is established from the toe of the backstop and extends in the direction of bullet flight for 300 yards. The zone continues or is measured in a fan shape at a 30 degree angle of disbursement on each side of the backstop. Projectiles recovered beyond the 300 yard distance are typically the result of direct fire bullet escapement*

In reviewing the Public Comment Notes from a December 12, 2018 public information meeting I read of the concern from some citizens that the rounds collected were a result of shooting coming from the surrounding hills. This may be a possibility to some minimal extent. Given the location where the majority of the rounds were found and the proximity to the ridgeline that lies between the range and landfill, I believe these rounds came from the range.

The majority of the collected rounds were found within 3000 feet of the firing lines. From the firing line of the Long and Short bays a minimal muzzle rise is all that would be

necessary for the projectile to clear the ridgeline in question. This would result in projectiles making their way to the landfill prior to any ricochet occurring.

An additional fact that supports my conclusion is this past year 3 grass fires were started beyond the confines of the range and the determined cause of the fires was ruled sparks caused by ricochet rounds impacting rocks. When looking back toward the range from the landfill area the back side of the ridgeline shows evidence of one of the grass fires mentioned above.

It is impossible to determine the energy factor associated with these bullets at the time they impacted the ground where recovered. Too many factors such as free flight, ricochet, or even how many times the projectile ricocheted before coming to a stop are impossible to know.

However, typical free flight distances for a few of the common calibers which include many of the recovered bullets referenced in this report are as follows:

- 22LR 40gr            1,458 yards
- .223 55gr            4,300 yards
- .308WM 250gr       5,168 yards
- 50BMG 750gr       8,444 yards

#### Long Range Bay:

The 300 yard rifle bay has a backstop that does not meet the minimum suggested height published in the NRA Range Source Book (NRARSB) and is too low to expect total projectile containment. A backstop is a device constructed to stop or re-direct bullets fired on a range. A backstop is the key component providing range safety and use for people in the area in and beyond a rifle or pistol range.

Current NRA safety philosophies are predicated toward range self-containment of shot rounds, i.e., "if it's shot here, keep it here". A properly constructed backstop at a rifle and/or pistol range are usually constructed out of a core material of compacted soil, rock or crushed cement, covered by rock-free earthen material, up to a recommended height of twenty (20) feet at a 1:1 slope (soil type dependent), with a 4 foot-wide flat top. Backstop width will be dependent upon the numbers of shooting stations the range operator wants installed at the firing line.

The toe of the backstop's slope may be stabilized with sandbags or like material to prevent slumping or on-going erosion. Other alternatives for backstops include steel bullet traps (various models and styles exist), a membrane-skin covering ground, recycled chopped rubber airplane tires, or a pressed block material of the same substance.

This bay does not have Side Berms (Exterior Berms) which are typically an earthen or concrete embankment or wall constructed to restrict bullets to a given area. Keeping with the philosophy of self containment, a side berm greatly reduces any chance that



discharged rounds will travel outside the left and right bounds of the bay. The NRARSB recommends the minimum height of side berms be eight feet with a minimum or width at the top of 3-4 feet.

The intermediate target line positions are in need of repair. The concrete foundations are shot to the point that exposed rebar is found along the entire length. There are sections of old steel train rails that are shot to pieces. (See fig. 3)

Glass pieces and various other inappropriate makeshift target materials are visible on the ground along the entire downrange area.

There is evidence of traditional and steel targets being positioned in/on the surface of the backstop. These findings are relevant as it is an indication of inappropriate shooting activity/behavior taking place on the range.



Figure 3

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions in this bay. (See fig. 4) The firing line under the covered positions is adequately marked. The firing line for the 20 uncovered positions is not adequately defined.

### Short Range Bay

The 50 yard rifle bay backstop does not meet the minimum suggested height published in the NRARSB and is too low to expect total projectile containment. The high point of the backstop is approximately 12 feet. (See fig. 5)

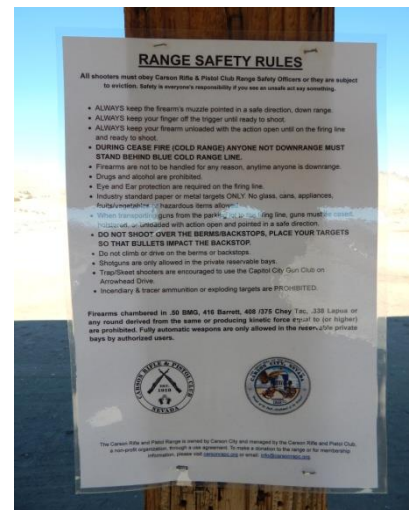


Figure 4



Figure 6



Figure 5

Side berms fail to meet the minimum suggested height published in the NRARSB and are too low to expect total projectile containment. They also taper from a high point at the backstop intersection back towards the firing line. (See fig. 6)

The Northwest Corner of the left side berm and the left side of the backstop is not high enough to guarantee projectile containment in the direction of the 100, 200, and 300 yard target positions of the adjacent Long Range bay. The Northwest corner of this particular bay is a major concern as the height of this side berm and backstop junction are critical elements to keeping people safe while changing targets down range in the Long Bay during Short bay shooting activities.

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions in this bay.

### Shooting Range 1

By design, there are no fixed shooting positions in this bay built to accommodate pistol use only. This allows the user to utilize this bay for tactical training such as movement while shooting or other dynamic types of training.

The 50 yard rifle/pistol bay backstop does not meet the minimum suggested height published in the NRARSB and is too low to expect total projectile containment. Safety rules are placed at Shooting bay 1 location. (See fig. 7)

Side berms fail to meet the minimum suggested height published in the NRARSB and are too low to expect total projectile containment.

There is evidence that shooting latterly across (left to right) in the direction of the side berms has been taking place.



**Figure 7**

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions or type of potential shooting activity in this bay.

### Shooting Range 2

By design, there are no fixed shooting positions in this bay built to accommodate pistol use only. This allows the user to utilize this bay for tactical training such as movement while shooting or other dynamic types of training.

The 50 yard bay has a backstop and side berms that fail to meet the minimum suggested heights published in the NRARSB and are too low to expect total projectile contain-

ment. The backstop in this bay is positioned directly in front of a ragged rock outcropping. (See fig. 8)

As referenced above, a properly constructed backstop at a rifle and/or pistol range are usually constructed out of a core material of compacted soil, rock or crushed cement, covered by rock-free earthen material, up to a recommended height of twenty (20) feet at a 1:1 slope (soil type dependent), with a 4 foot-wide flat top.



Figure 8

The rocky surface directly behind the backstop in this bay is a dangerous situation as projectiles hitting this hard irregular rocky area have a higher potential to ricochet than to remain captured.

There is evidence that shooting latterly across (left to right) in the direction of the side berms has been taking place.

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions or type of potential shooting activity in this bay.

### Shooting Range 3

By design, there are no fixed shooting positions in this bay built to accommodate pistol use only. This allows the user to utilize this bay for tactical training such as movement while shooting or other dynamic types of training.

The 50 yard bay has a backstop and side berms that fail to meet the minimum suggested heights published in the NRARSB and are too low to expect total projectile containment. The backstop in this bay is positioned directly in front of a ragged rock outcropping.

There is evidence that shooting latterly across (left to right) in the direction of the side berms has been taking place.

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions or type of potential shooting activity in this bay.

### Shooting Range 4

By design, there are no fixed shooting positions in this bay. This allows the user to utilize this bay for tactical training such as movement while shooting or other dynamic types of training.

The 57 yard bay has a backstop and side berms that fail to meet the minimum suggested heights published in the NRARSB and are too low to expect total projectile containment. The backstop in this bay is positioned directly in front of a ragged rock outcropping.

There is evidence that shooting latterly across (left to right) in the direction of the side berms has been taking place.

The range firearm safety rules and other safety signs are not adequate for the number of shooting positions or type of potential shooting activity in this bay.

## Recommendations

1. The current range check-in procedures are not adequate to provide an expectation of appropriate shooting range etiquette and safety rules knowledge and behavior. **The current access procedure may be considered marginally appropriate if all firing lines were manned by a Range Safety Officer (RSO).**

To operate this facility without an RSO present will require new access procedures. Prior to gaining access to the facility shooters should be required to attend either in person or complete online a range safety and orientation class/briefing. Some form of acknowledgement of successful completion should be established.

The establishment of this pre access process/requirement should be developed by the Club and approved by the Carson City Parks and Recreation Department. At the very least this program should include; Firearm Safety Rules, Range Rules, Range behavior guidelines with appropriate disciplinary actions and penalties for violations.

Gate access in uncontrolled firing line ranges is often accomplished with access cards or specific gate codes issued only to approved program graduates.

I would suggest a comprehensive log in sheet system which captures at a minimum; shooter (s) name, date, time in, time out, shooting bays used, and weapons used. These log sheets should be collected reviewed and filed for a minimum of 120 days.

2. The range perimeter signage does not exist beyond the main gate sign. I recommend signs that say "Caution Shooting Range" or "Caution Live Fire Shooting Range" or similar be posted at least every 150 feet along the entire perimeter on all 4 sides. I would also recommend consideration of installing a fence around the entire perimeter. This fence need not be very elaborate in design (a single wire strand design would suffice) but should be in place along with the suggested



signage to clearly mark the property boundary and alert any passersby that they are entering a live fire area.

3. The backstop height should be increased to the suggested height of at least 20 feet with a minimum of 4 feet width/depth at the highest part **ON ALL BAYS.** See the NRARSB for backstop design considerations. All berms and backstops would benefit from additional grooming and maintenance as is recommended by the NRARSB.
4. The rocky outcropping behind the backstop in Shooting Bay 2 needs to be addressed. There are many ways to neutralize this rocky area. Removing the rock surface or covering the area with dirt, rubber, or wood may all be appropriate solutions.
5. The Side Berm height should be increased to the suggested height of at least 8 feet with a minimum of 4 feet width/depth at the highest part **ON ALL BAYS.** See the NRARSB for backstop design considerations. All berms and backstops would benefit from additional grooming and maintenance as is recommended by the NRARSB.
6. If this range is to be operated as an uncontrolled (no RSO control) firing line a 'No Blue Sky Bay" design should be considered for both the Long and Short bays. Blue-sky is the area a firearm shooter sees above the range backstop (i.e., the blue sky above the backstop), when sitting or standing at the firing line. Eliminating this portion of a shooter's view will eliminate the likelihood that any bullet will travel over the backstop area, leaving the shooting range.

Blue-sky elimination can be accomplished through installation of a single or a multiple set of baffles. Another proven technique is the installation of a sight restrictor at the firing line, preventing the shooter from seeing above a certain height. This can be in the form of a portable stand made of wood or other materials that eliminates sight above a pre-selected height on the backstop, a piece installed from the front side of the firing line enclosure, or a similar device.

Examples of possible baffle solutions can be found figures 9 and 10. A properly engineered overhead downrange baffle system is the only way to guarantee projectile containment.



Figure 9



**Figure 10**

In the absence of an overhead baffle system it is impossible to guarantee projectile containment even under the supervision and management of an RSO.

7. The uncovered shooting positions/firing line on the Long Range bay must be better identified or established. This can be achieved in many ways such as a physical barrier, a change in material on the ground or some form of permanent marking.
8. The deteriorated concrete intermediate target stand structures should be removed from all bays to include the exposed rebar and rail road steel rails. If new target stand system is to be installed it should be designed as to eliminate bullet impact.

Target stands can be permanent or temporary in design. Target stands will get hit by bullets and should be constructed in a manner that facilitates easy repair or replacement. Common solutions include wooden railroad ties with metal target stand brackets placed on the tie back side or holes bored into the tie top. The target legs are then placed into the brackets or holes by the shooter or range staff.

Commercially available rubber blocks such as those made by Ranges Systems Corporation are a very cost effective way of protecting the down range equipment such as target holders. These rubber blocks can sustain over 2000 projectile hits before needing to be serviced.

9. A policy should be established and aggressively enforced that prohibits the placement of any targets on the backstop and or berm surfaces. Target stand structures as suggested above will greatly reduce the placement of targets in inappropriate locations.
10. A policy should be established and aggressively enforced that prohibits the shooting of any targets that are not designed to be shot. This would prohibit the shooting of bottles, cans, TV's and other nontraditional targets.

11. A policy should be established and aggressively enforced that prohibits the shooting in any direction but down range. In situations where side to side shooting is desired the side berms should be constructed to the backstop standard i.e.: minimum 20 feet tall and at least 4 feet wide at the top.
12. Installation of a phone system or some other method of communication between shooting bays should be considered. At the very least a method of calling 911 and a procedure to facilitate this emergency procedure should be worked out and published.
13. Installation of an electronic firing line monitor with audible alarm for firing line breaches during shooting activities. If open shooting is allowed the activation of this system will be the responsibility of the first person to begin shooting operations on that bay. The system should be active during all shooting activities. The last person shooting will be responsible for turning off the power as they leave the bay.

An alternative solution to firing line management would be the use of a Hot/Cold range flag indicating current shooting status. However, a responsible person (RSO) would need to be present to maintain verbal control of all shooters at all times.
14. Range Safety Rules should be posted between every 4<sup>th</sup> shooting lane. Other safety related rules of operation or expected behavior signs should be positioned in appropriate numbers and locations to provide the best opportunity for all shooters to see.
15. Shooters would realize added safety and sound attenuation between bays if the side berms between the shooting bays were raised. Reducing the noise between shooting bays would also make it easier for instructors and range officers to conduct activities concurrently throughout the facility.
16. A lead management plan should be developed which includes and or follows current best practices for outdoor ranges. See EPA Document; Best Management Practices for Lead at Outdoor Shooting Ranges EPA-902-B-01-001 Revised June 2005 Region 2

## **Conclusion**

The Carson City Rifle and Pistol Range located at 4000 Flint Drive Rd. Carson City, Nevada 89701 has a very long tradition of supporting and promoting the shooting sports in the greater Carson City, Nevada region. The facility is embraced by the community and is one of the nicest facilities I have inspected.

The purpose for this visit was to assess and evaluate the current operations and design

of the entire facility. The current range design and construction as I inspected, for the most part has many outstanding qualities and amenities not often found in outdoor shooting ranges.

The primary shortcoming of this facility is in the construction and layout of the outdoor shooting bay backstops, absence of baffles, and the side berms. The recommended repairs on these safety elements would tremendously enhance the safety of the facility and the surrounding property.

A secondary area of concern is the lack of access control and overall supervision of shooting activities. I am not opposed to unsupervised shooting ranges. In fact, there are many unsupervised ranges operating safely across the country. However, the level of safety on an unsupervised range is directly proportionate to the level of access and shooter education.

To allow unsupervised access to this facility without the benefit of participant training and orientation to the rules and acceptable behaviors is risky at best. Shooters utilizing this facility especially the fact that the range is actually a city park, have a reasonable expectation of safety.

It is very difficult if not impossible to expect a reasonable level of firearm handling, range etiquette and overall compliance to the rules if there is no process in place to educate everyone to a basic level of rules and expectations. The need for this access control and additional education is evidenced by the findings of my inspection. Broken glass and nontraditional target material found down range, the obvious bullet impact points in the side berms are but a few of the violations of the rules listed on the club website and on the limited posted range signage.

We must all understand that even the most secure ballistic envelope can be compromised based on the intent of the shooter.

Appendix B is a listing of Shooting Range Guidance publications which may assist in the development of procedures, rules and compliance documents and practices.

Submitted by:



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January 07, 2019

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Date



# Appendix A



# Appendix B

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## Shooting Range Guidance

### EPA GUIDANCE

- **EPA Region 2 Website**
  - <http://www.epa.gov/Region2/waste/leadshot/>
- **EPA Brochure: “Do You Use Best Management Practices for Lead at Your Outdoor Shooting Range?”, 2001.**
  - <http://www.epa.gov/Region2/waste/leadshot/brochure.pdf>
- **EPA Guidance Manual: “Best Management Practices for Lead at Outdoor Shooting Ranges”, January 2001.**
  - <http://www.epa.gov/Region2/waste/leadshot/download.htm>
- **EPA Certification Program**
  - <http://www.epa.gov/Region2/waste/leadshot/certif.htm>
- **EPA Presentation on Best Management Practices for Lead at Outdoor Shooting Ranges**
- **EPA Innovative Technology**
  - [http://www.clu-in.org/conf/itrc/smartemp\\_062805/resource.cfm](http://www.clu-in.org/conf/itrc/smartemp_062805/resource.cfm)

### DOD GUIDANCE

- **DOD Guidance on Range TRI Reporting, March 2000.**
  - [Range Guidance 3.0](#)
- **US Army Guidance: “Prevention of Lead Migration And Erosion From Small Arms Ranges”, August 1998.**
  - [www.uscg.mil/Systems/gse/ET.final.02.04.pdf](http://www.uscg.mil/Systems/gse/ET.final.02.04.pdf)
- **Sustainable Management of Leadon Small Arms Ranges**
  - <http://www.dtic.mil/ndia/2003environ/ed3.pdf>
- **Soil Treatments to Limit Lead Mobility**
  - [http://www.rangeinfo.org/resource\\_library/NSRS/04PolicyTrack/SoilTreatments.pdf](http://www.rangeinfo.org/resource_library/NSRS/04PolicyTrack/SoilTreatments.pdf)

### DOI Website

- <http://www.doi.gov/greening/sustain/shooting.html>

### INDUSTRY GUIDANCE

- **National Sports Shooting Foundation, “Environmental Aspects of Construction and Management of Outdoor Shooting Ranges”, 1997**
  - [http://www.rangeinfo.org/resource\\_library/facility\\_mngmnt/environment/EAofCMofOSR.PDF](http://www.rangeinfo.org/resource_library/facility_mngmnt/environment/EAofCMofOSR.PDF)

- **National Shooting Range Symposium: Environmental Laws as They Apply to Shooting Ranges**
  - [http://www.rangeinfo.org/resource\\_library/NSRS/08PolicyTrack/EnvLaws.pdf](http://www.rangeinfo.org/resource_library/NSRS/08PolicyTrack/EnvLaws.pdf)
- **National Association of Shooting Ranges**
  - [http://www.rangeinfo.org/resource\\_library/resLibDetl.cfm?CAT=Facility%20Management](http://www.rangeinfo.org/resource_library/resLibDetl.cfm?CAT=Facility%20Management)
- **National Rifle Association – Range Source Book must be ordered**
  - <http://www.nrahq.org/shootingrange/sourcebook.asp>

### **MISC STATE GUIDANCE**

- **Colorado Department of Public Health and Environment. “Corrective Action at Outdoor Shooting Ranges Guidance Document.” January 2005**
  - <http://www.cdphe.state.co.us/hm/shootingrange.pdf>
- **Indiana. The DNR Shooting Range Program. March 2004.**
  - <http://www.in.gov/dnr/files/shooting.pdf>
- **Michigan Dept of Environmental Quality: “Managing Lead at Your Shooting Range”, June 2001**
  - <http://www.oshainfo.gatech.edu/lead/stewardship.pdf>
- **State of Florida Website that includes the following:**
  - **Florida Dept of Environmental Protection: “Best Management Practices For environmental Stewardship of Florida Shooting Ranges”, 2004**
  - **Florida Dept of Environmental Protection: Range Operator Checklist**
  - **Florida Dept of Environmental Protection: Record-Keeping And Evaluation Checklist**
  - <http://www.dep.state.fl.us/waste/categories/hazardous/pages/lead.htm>
- **Massachusetts Dept of Environmental Protection: “Managing Lead Shot at Your Range”, 2001**
  - [www.mass.gov/dep/toxics/stypes/pbbro2.doc](http://www.mass.gov/dep/toxics/stypes/pbbro2.doc)

### **SAMPLE STEWARDSHIP PLANS**

- **Environmental Stewardship Plan- Rod and Gun Club & Sportsman Association**
  - [http://www.rangeinfo.org/resource\\_library/resLibDetl.cfm?CAT=Facility%20Management](http://www.rangeinfo.org/resource_library/resLibDetl.cfm?CAT=Facility%20Management)
- **State of Florida: Environmental Stewardship Plan Template**
  - [http://www.dep.state.fl.us/waste/quick\\_topics/publications/shw/hazardous/shootingrange/EnvironmentalStewardship\\_word.doc](http://www.dep.state.fl.us/waste/quick_topics/publications/shw/hazardous/shootingrange/EnvironmentalStewardship_word.doc)
  -
- **National Association of Shooting Ranges: Environmental Stewardship Plan Templates**
  - [http://www.epa.gov/region2/waste/leadshot/bmp2\\_7.pdf](http://www.epa.gov/region2/waste/leadshot/bmp2_7.pdf)

## **MISC. GUIDANCE**

- **Interstate Technology and Regulatory Council, “Characterization and Remediation of Soils at Closed Small Arms Firing Ranges”, January 2003**
  - <http://www.itrcweb.org/Documents/SMART-1.pdf>
- **Interstate Technology and Regulatory Council, “Environmental Management at Operating Outdoor Small Arms Firing Ranges”, February 2005**
  - <http://www.itrcweb.org/Documents/SMART-2.pdf>

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