



Headquarters Marine Corps

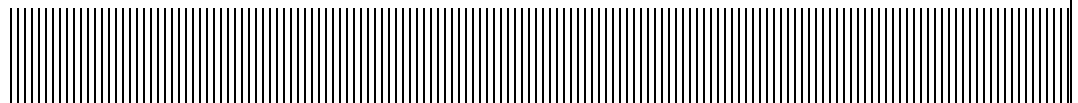
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FINAL

Range Environmental Vulnerability Assessment

Marine Corps Air Station
Cherry Point

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Executive Summary

The United States (U.S.) Marine Corps (Marine Corps) Range Environmental Vulnerability Assessment (REVA) program meets the requirements of the current Department of Defense (DoD) Directive 4715.11 *Environmental and Explosives Safety Management on Operational Ranges within the United States* and DoD Instruction 4715.14 *Operational Range Assessments*.

The purpose of the REVA program is to identify whether there is a release or substantial threat of a release of munitions constituents (MC) from the operational range or range complex areas to off-range areas. This is accomplished through the use of screening-level fate and transport modeling and analysis of the indicator MC based upon site-specific environmental conditions at the operational ranges and training areas at an installation. Indicator MC selected for the REVA program include trinitrotoluene (TNT), hexahydro-trinitro-triazine (RDX), cyclotetramethylene tetranitramine (HMX), and perchlorate.

This report presents the assessment results for the operational ranges and training areas at Marine Corps Air Station (MCAS) Cherry Point Range Complex, North Carolina. The assessment covers the operational range area on MCAS Cherry Point proper and the noncontiguous outlying areas and bombing targets. This report is the first comprehensive report on MC associated with the operational ranges at MCAS Cherry Point and serves as the baseline of environmental conditions of the operational ranges.

Military Munitions Training and Operations

MCAS Cherry Point includes more than 13,000 acres on the air station proper, with nearly 16,000 additional acres of auxiliary activities. MCAS Cherry Point is headquarters to the 2d Marine Aircraft Wing (MAW), as well as Marine Aircraft Group 14, Marine Wing Support Group 27, and Marine Air Control Group 28. The Marine Corps' only Harrier training squadron and only Hercules training squadron are also located at the air station. The KC-130 squadron is configured primarily for aerial refueling missions, but troop and cargo transport can also be accomplished with the workhorse Hercules airframe. Marine Wing Support Group 27 provides logistical support for the wing, with Marine Wing Support Squadron 274 located at the air station and Marine Wing Support Squadron 271 providing support for Marine Corps Auxiliary Landing Field (MCALF) Bogue. Other major tenant units at MCAS Cherry Point are the Naval Aviation Depot and the U.S. Naval Clinic. Approximately 7,486 Marines and sailors are stationed at MCAS Cherry Point, along with nearly 5,700 civilian employees (MCAS Cherry Point, n.d.).

MCAS Cherry Point maintains operational ranges on the air station proper, as well as on noncontiguous properties. The noncontiguous operational ranges include one Marine Corps Outlying Landing Field (MCOLF), one MCALF, and four bombing targets, for a total of seven distinct operational areas. Two of the bombing targets (Bombing Target 11 [Piney Island] and Bombing Target 9) were not assessed under REVA, but will be assessed as part of an on-going sediment transport study being conducted by the University of South Carolina. The current, as well as historical, uses of the operational ranges were assessed under REVA. The five distinct operational range areas associated with MCAS Cherry Point assessed as part of the REVA program are:

- MCAS Cherry Point proper,
- MCOLF Atlantic,
- MCALF Bogue,
- MAW Point, and
- Pamlico Point.

Conceptual Site Model

Since each of the five operational range areas are located in different areas, an individual conceptual site model was developed for each area. However, these areas are all located in the Tidewater Region of Coastal North Carolina. Hurricanes, which contribute to severe flooding and damage to low-lying areas near the ocean, sounds, bays, rivers and creeks, are not unusual for these areas.

MC accumulated in the MC loading areas can migrate to potential receptors via the following exposure pathways: surface water runoff and leaching to groundwater with subsequent groundwater mixing with surface water flushing. Special status ecological receptors are the only identified point of exposure for receptors at MCAS Cherry Point.

Surface waters in the areas of the operational ranges are not used as drinking water sources. However, these waters potentially are used for recreational purposes. In addition, these waters potentially support federal and state threatened and endangered species. The federal and state threatened and endangered species that potentially are supported by surface water in and around MCAS Cherry Point include manatee, bald eagle, red-cockaded woodpecker, American alligator, loggerhead turtle, green turtle, Kemp's Ridley turtle, shortnose sturgeon, sensitive joint-vetch, rough-leaf loosestrife, and spring goldenrod (INRMP, 2001).

There are no known users of shallow groundwater at the operational range areas since public water supply is based on water wells tapping two deeper aquifers: the upper and lower Castle Hayne. There are no known potential off-site receptors of groundwater

since all shallow groundwater discharges either into the interior surface water features or, ultimately, into bordering major surface water streams and tidal estuaries.

Screening-level Groundwater Transport Analysis

Screening-level groundwater transport analyses were conducted for all five operational range areas assessed to conservatively estimate the concentrations of MC potentially impacting groundwater at MCAS Cherry Point. MC concentrations in groundwater were estimated according to the process described in the *REVA Reference Manual* (former *REVA User's Guide*, MPI 2006). The first analysis estimates the potential for MC to reach the water table based on the calculated MC loading. If MC have the potential to reach the water table, then subsequent analyses are performed to determine whether MC concentrations are anticipated to reach exposure endpoints.

The screening-level analyses estimated that MC concentrations for all indicator MC would not reach the water table above REVA trigger values (i.e., method detection limits) or MC loading areas at MCAS Cherry Point proper (see Section 7.1 and MCALF Bogue (see Section 7.3); therefore, no additional analyses were performed for these areas.

Concentrations of indicator MC at the Field Maneuver/Training Area at MCOLF Atlantic were not predicted to reach the water table. Estimated concentrations of RDX, TNT, and perchlorate were predicted to reach the water table at the Rocket Range historical use area at MCOLF Atlantic and the MC loading areas of MAW Point; therefore, two-dimensional (2D) modeling was performed for each of these areas. The 2D models predicted plumes of RDX, TNT, and perchlorate occurring during active loading times and quickly degrading once loading ceased. Current MC concentrations of RDX, TNT, and perchlorate are estimated to be below REVA trigger values at these locations.

RDX, TNT, and perchlorate concentrations at Pamlico Point were estimated to reach the water table above the REVA trigger values; therefore, 2D modeling was also performed for this area. The 2D model predicted plumes of RDX, TNT, and perchlorate during the time of active loading. The current concentrations of RDX and TNT are predicted to be below REVA trigger values. The predicted perchlorate concentration estimated at the ocean boundary (12 micrograms per liter [$\mu\text{g/L}$]) is above the REVA trigger value. The only anticipated receptors are aquatic ecological. This predicted perchlorate concentration is below both the chronic freshwater water quality criteria of 9,300 $\mu\text{g/L}$ and the no-observed-adverse-effect-level for amphibians of 23 $\mu\text{g/L}$.

Screening-level Surface Water Transport Analysis

Screening-level surface water transport analyses were conducted for all five operational range areas assessed to conservatively estimate the dissolved-phase concentrations of MC reaching their respective exposure endpoints. MC concentrations in surface water were estimated at the edge of the MC loading areas and at the final discharge locations, if

necessary. MC concentrations at the final discharge locations accounts for down gradient mixing.

The screening-level analysis estimated that average annual concentrations of all indicator MC modeled would be below REVA trigger values (i.e., below method detection limits) in runoff at the edges of individual loading areas; therefore, no further surface water analyses were conducted.

Small Arms Range Assessments

The primary MC of concern at small arms ranges (SARs) is lead because it is the most prevalent (by weight) potentially hazardous constituent associated with small arms ammunition. Modeling parameters for lead fate and transport are contingent upon site-specific geochemical data that are generally unavailable. Therefore, SARs are qualitatively assessed under the REVA program to identify factors that influence the potential for lead migration.

There are three SARs located at MCAS Cherry Point. They are located in the Small Arms Range Complex at MCAS Cherry Point proper. Following the Small Arms Range Assessment Protocol, the pistol range received a “minimal” score while the small bore and familiarization range (action range) and rifle range each received a “moderate” score.

To view the complete report, please go to <https://www.cherrypoint.usmc.mil/EA/RES.asp>

