Kahuku Training Area, Hawai'i

April 2023

Background

DoD uses and manages operational ranges to support national security objectives and maintain the high state of operational readiness essential to its mission requirements. The Department conducts non-regulatory, proactive, and comprehensive operational range assessments (ORAs) to support the long-term sustainability of these ranges while protecting human health and the environment. The purpose of an ORA is to determine if there is a release or substantial threat of a release of munitions constituents (MC) from an operational range to an off-range area that exceeds an applicable regulatory standard or creates a potential unacceptable risk to human health or the environment.

The Army ORA effort was developed to address DoD requirements detailed in DoD Directive 4715.11 (10 May 2004) and DoD Instruction 4715.14 (15 November 2018). The overall objective of the ORA is to assess operational ranges/range complexes to determine if an off-range MC release or substantial threat of an off-range MC release exists; if an off-range MC release exists, does it exceed an applicable regulatory reporting standard; and if an MC release or substantial threat of a release exists, determine whether it creates a potentially unacceptable risk to off-range human health or the environment. Army ORAs assess potential off-range migration of MC along surface water system and groundwater migration pathways.

Installation Overview

Kahuku TA occupies approximately 9,456 acres at the northern end of the Ko'olau Mountain Range, in northern O'ahu, Hawai'i. The installation is comprised of nine maneuver and training areas, one drop zone, and one Combined Arms Collective Training Facility (CACTF). Preservation land, both agricultural and forest, surround Kahuku TA on both the southeast side and northwest side of the installation. Private agricultural land lines the northeast perimeter, and Kawailoa TA lies on the southern boundary of the installation.

Operational Range Assessment Findings (04/2023)

Based on observed conditions, updated data, and Advanced Assessment results, the conclusions of the 2015 Phase II remain valid. No off-range MC release or substantial threat of an off-range MC release currently exists. MC associated with the historical dudded impact area are not migrating and are therefore not present at levels that pose an unacceptable risk to off-range human and/or ecological receptors.

Next Steps

Kahuku Training Area (TA)'s operational ranges remain categorized as Unlikely and should be included in the FY 23–27 cycle of ORAs to satisfy re-assessment requirements.

Map of Range/Range Area

Previous ORA Investigations

The 2007 Phase I ORA evaluated 17 operational ranges and concluded that there was a limited source of MC associated with current non-live-fire maneuver training; however, a historical MC source was identified due to the historical use of live-fire and practice medium and large caliber munitions, rockets, and pyrotechnics/obscurants throughout the maneuver training areas.

All 17 operational ranges were categorized as Inconclusive based on the presence of a source, potential surface water and/or groundwater migration pathways, and off-range human and ecological receptors. These 17 Inconclusive ranges were recommended for further evaluation through a Phase II.

A Phase II ORA was completed in 2015 based on the findings of the Phase I ORA. Prior to the Phase II sampling investigation, additional information collected during the site reconnaissance was evaluated. The general outline of a historical surface danger zone was identified, and interviews revealed that munitions were primarily fired into a centrally located dudded impact area. As a result, the Inconclusive range area within Kahuku TA was reduced from 17 operational ranges, totaling 8,832 acres, to portions of 3 operational ranges, encompassing 1,118 acres.

The Phase II field sampling event was conducted in July 2013 and included the collection of sediment and groundwater samples. No surface water samples were collected due to insufficient rainfall/runoff during the 2012–2013 wet season that prevented a rise in stream water level within the ephemeral stream channels for the collection of 2-hour storm samples.

Sediment samples were collected from two locations, one downstream of potential MC source areas in ʻŌʻio Gulch and one upstream reference within Kawela Gulch, an adjacent watershed, that does not receive influence from the potential MC source areas. Groundwater was collected from an existing supply well within the wash rack facility, downgradient of the historical dudded impact area in the northeastern portion of the installation.

Sediment samples were analyzed for metals and explosives and groundwater was analyzed for metals, explosives, and perchlorate.

Based on sampling results, MC were not migrating off-range at levels that posed an unacceptable risk to human health or the environment. Kahuku TA's Inconclusive ranges were re-categorized as Unlikely for the following reasons:

- No explosives were detected in sediment or groundwater.
- The 95 percent upper confidence limit of the mean (UCLM) of copper in sediment exceeded ecological screening levels at the downstream location; however, average downstream concentrations were not significantly greater than average reference concentrations indicating the potential risk is not range-related.
- The average downstream concentrations of antimony and lead in sediment were significantly greater than the average reference concentrations indicating migration was occurring; however, the 95 percent UCLMs did not exceed screening levels indicating there was no risk to off-range receptors.
- No metals or perchlorate were reported at concentrations exceeding potable screening levels or above the lower bound of the associated ranges of uncertainty in groundwater.

ORA Advanced Assessment (2022)

As part of the Advanced Assessment, each component of the previous CSM (developed during the 2015 Phase II) was re-evaluated to determine if any changes to associated sources, pathways, or receptors had occurred. The updated CSM was then used to help determine whether potential MC was migrating off-range.

Because range use and source loading has remained relatively stable since the Phase II and the results from the Phase II ORA concluded that there was no MC migration from ranges that have been used for over 70 years, media sampling was unnecessary. In lieu of sampling, the Training Range Environmental Evaluation and Characterization System (TREECS) was used to perform an updated Tier 1 assessment specific to Kahuku TA's worst-case source area and its associated drainage area.

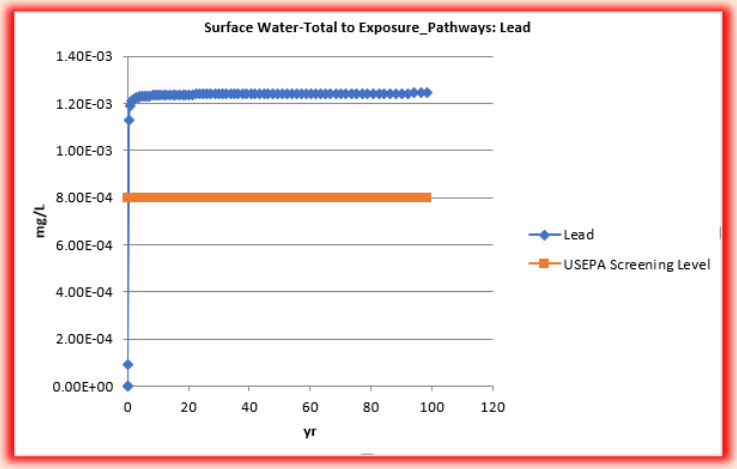
ORA Advanced Assessment (2022) continued

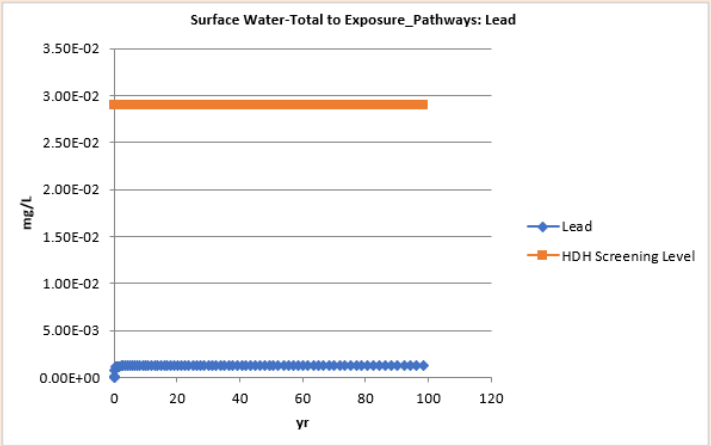
This conservative, worst-case module was used to predict if MCOC concentrations in off-range media (groundwater, surface water, and sediment) would exceed protective ecological and human health benchmarks.

The surface water and groundwater modeling approach included the development of a Tier 1 (USACE 2012) TREECS model to predict if MC concentrations in off-range media exceeded or may exceed protective human health and ecological screening benchmarks in the future. To determine the Area of Interest (AOI) to be used in the model, an evaluation of the Phase II results, updated Range Facility Management Support System (RFMSS) data, potential migration pathways, and current range usage was conducted as part of the preparatory steps for developing the model input parameters. For both surface water and groundwater, the ʻŌʻio Watershed represents the worst-case scenario for the migration of MCOC from the source areas and, therefore, the model focused on an AOI encompassing 1,197.81 acres within the ʻŌʻio Watershed.

Surface water, sediment, and groundwater were initially modeled through TREEC's Tier 1 model. Tier 1 is a conservative model for leaching and transport of constituent concentrations over a 100-year period. No modeled concentrations of copper, RDX, HMX, TNT, or perchlorate were predicted to exceed the applicable human health or ecological screening levels in surface water. Surface water results from the Tier 1 model indicated concentrations for lead after 1 year of source loading exceeded the USEPA ecological screening level (0.0008 milligram per liter [mg/L]). No copper concentrations exceeded the USEPA ecological screening level, and no concentrations of lead or copper exceeded the human health screening level. In the absence of site-specific hardness data, it was determined to be more appropriate and representative of site conditions to compare lead and copper concentrations to the Hawaii Department of Health (HDH) ecological screening levels (0.029 mg/L [lead] and 0.006 mg/L [copper]), which were calculated using using an average Hawaii water hardness of 34 mg/L calcium carbonate (CaCO2) (HydroFLOW 2023). No concentrations of copper or lead in surface water exceeded their respective HDH ecological screening level. For sediment, no modeled concentrations of copper, lead, RDX, HMX, or TNT were predicted to exceed the applicable ecological screening levels.

The results for the groundwater Tier 1 model indicated no metals, explosives, or perchlorate would exceed the USEPA drinking water standards based on loading over a 1,400-year period (the time period required to reach equilibrium conditions).





Based on observed conditions, updated data, and the modeling results, the conclusions of the 2015 Phase II ORA remain valid and no off-range MC release or substantial threat of an off-range MC release currently exists. MC associated with the most heavily used ranges are not migrating and are therefore not present at levels that pose an unacceptable risk to off-range human and/or ecological receptors.

For more information on Kahuku TA, contact the PAO Office: usag.hawaii.pao@army.mil
For more information on the DoD Operational Range Assessment Program visit https://www.denix.osd.mil/orap/home/