



Fort Drum, New York

June 2020

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.

Range Overview

Fort Drum occupies approximately 108,809 acres in upstate New York, approximately 80 miles north of Syracuse, and 25 miles southeast of the United States and Canadian border. Fort Drum occupies a large portion of northeastern Jefferson County, a portion of western Lewis County, and abuts the southern edge of St. Lawrence County. The city of Watertown lies approximately 5 miles southwest of the installation.

Operational Range Assessment Findings (06/2020)

Results of the Advanced Assessment surface water and sediment sampling showed that potential MC associated with the most heavily used ranges at Fort Drum are migrating off-range, but concentrations are less than respective screening levels. Additionally, concentrations do not pose a risk to off-range ecological receptors. Results of the Advanced Assessment groundwater sampling showed that potential MC associated with the most heavily used ranges at Fort Drum are not migrating to the spring-fed Village of Philadelphia reservoir and there is no risk to off-range receptors.

Next Steps

The installation's operational ranges should be included in the FY23-27 cycle of ORAs to satisfy re-assessment requirements. While there is no risk to off-range downstream human or ecological receptors, there was evidence of MCOC migration within the worst-case Indian River Watershed. Therefore, the full CSM should be re-evaluated for migration and potential risk during reassessment.

Map of Range/Range Area



Range Overview (continued)

Fort Drum currently consists of 171 operational ranges (totaling 98,225 acres) and a non-operational cantonment area (totaling 10,584 acres) located on the southwestern portion of the installation. The operational ranges include 51 live-fire ranges and 9 mortar firing points that are generally positioned in a wagon-wheel formation around 2 dudged impact areas, 71 maneuver training areas, 2 drop zones, 19 training sites (other), and 17 training sites (simulation). Current and historical munitions use within 97 operational ranges consists of large caliber, medium caliber, small caliber, explosives, pyrotechnics/obscurants, and other munitions. Additionally, two indoor small arms ranges and two Nuclear, Biological, and Chemical facilities were identified; however, these ranges are programmatically excluded under ORA.

Previous ORA Investigations

The 2006 Phase I ORA evaluated 139 operational ranges. The ORA concluded 42 ranges were Unlikely to have a source-pathway-receptor interaction because there was limited to no munitions use on the ranges. The other 97 ranges were categorized as Inconclusive with a source of MCOC, potential surface water and shallow groundwater migration pathways, and off-range human and ecological receptors. These 97 Inconclusive ranges were recommended for further evaluation through a Phase II.

The ORA Phase II re-evaluated the Phase I CSM and re-categorized 46 ranges as Unlikely prior to the sampling investigation. The remaining 51 ranges were further evaluated through Phase II sampling.

To evaluate the potential for MCOC to migrate via the surface water system, an Initial Investigation was conducted including the collection of surface water and sediment at off-range discharge points and upstream of the Inconclusive range areas near the installation boundary. Additionally, benthic macroinvertebrate samples were collected from locations where suitable conditions such as adequate flows and wadeable conditions were present. Subsequent to the Initial Investigation, an Expanded Investigation was conducted to further characterize sediment in the Indian River watershed due to elevated metals observed during the Initial Investigation.

Previous ORA Investigations (continued)

To evaluate the potential for MCOC to migrate off-range into private/domestic and public groundwater wells located downgradient of the operational range complex, groundwater samples were collected from 13 existing water supply wells and 5 monitoring wells (installed during the ORA Phase II) located between upgradient source areas and downgradient receptors.

Based on the data collected from the Phase II Initial and Expanded Investigations, no unacceptable off-range risks to human health or the environment were identified from MCOC migrating from operational ranges at Fort Drum and the Inconclusive ranges were re-categorized as Unlikely for the following reasons:

- No explosives or perchlorate were detected in surface water or sediment samples at concentrations that exceeded associated screening levels.
- Additionally, surface water and sediment results from Oswegatchie River, Black Creek and Lower Middle Indian River watersheds showed evidence of metals migration; however, concentrations did not exceed screening levels, which indicated no MCOC migrating off-range at levels that pose a risk to human health or the environment
- While sediment results from the Initial and an Expanded Investigation indicated the presence of metals migrating from source areas within the Indian River Watershed above acceptable levels, a screening level ecological risk assessment (SLERA) that was conducted to evaluate risk to receptors indicated that these concentrations are not expected to present unacceptable risks to benthic or piscivorous wildlife.
- RDX was detected in one water supply well; however, the concentration was attributed to activities associated with ammunition storage and handling within the ammunition supply point and was not associated with range activities. No perchlorate concentrations were detected above the screening level; however, perchlorate was detected below the range of uncertainty at several locations, including one background water supply well. While the source of perchlorate is unknown, the detection in background location suggested that the observed concentrations were not attributable to munitions usage.

Previous Investigations (continued)

- Isolated low levels of exceedances of antimony (MW-05) and zinc (WS-23) were also detected in groundwater. However, these results were not consistent with an expected pattern of MCOC migration. Thus, a consensus was made that no further groundwater sampling was required, and the groundwater pathway was to be ruled Unlikely.

Advanced Assessment Overview (2019)

Based on an evaluation of updated data gathered, no significant changes to Fort Drum's CSM components have occurred since the ORA Phase II. Surface water and sediment samples were collected at one upstream and one downstream location. Groundwater samples were collected from a spring-fed reservoir used as a potable water supply as the most probable exposure scenario for human receptors.

For surface water, no detected concentrations of metals MC exceeded their respective freshwater ecological screening levels and the average downstream concentration of antimony was the only metal that significantly exceeded its average reference concentration. Based on this finding, antimony may be migrating off-range from on-range source areas via surface water; however, the concentration does not pose an unacceptable risk to off-range receptors.

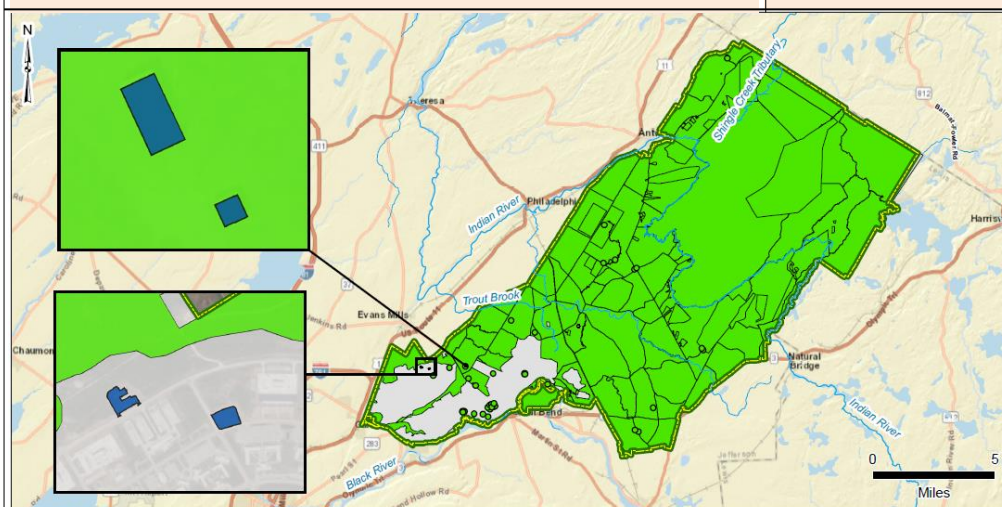
For sediment, the presence of antimony, copper, and lead at concentrations significantly greater than average reference concentrations in Indian River indicate that MCOC from the upstream source areas are migrating off-range in sediment.

Advanced Assessment Overview (2019) (continued)

However, no detected concentrations of antimony, copper, or lead exceeded their respective freshwater ecological screening levels. As such, no risk to downstream ecological receptors was identified for antimony, copper, or lead in sediment. The 95 percent UCLM of zinc in sediment exceeded the ecological screening level; however, the concentration was artificially inflated due to the high variance between the individual sample concentrations. As a result, the average concentration of zinc, which is less than the ecological screening level, is more representative of actual concentrations and was not significantly greater than the average reference concentration. Additionally, the presence of Balmat-Edwards Zinc Mining District northeast of Fort Drum, indicates significant naturally occurring zinc in the surrounding area. Σ SEM/AVS ratios less than 1 and the normalized Σ SEM-AVS/ f_{oc} ratios less than $130 \mu\text{mol/g}_{oc}$, indicate that divalent metals should not cause direct toxicity to benthic organisms.

Groundwater sample results showed no exceedances of MCOC when compared to the screening level and associated range of uncertainty. Based on the low-level detections of metals and perchlorate and no detections of explosives in groundwater, MC are not migrating from the operational range complex to the spring-fed Village of Philadelphia reservoir and there is no risk to off-range receptors.

Based on the findings of this assessment, all 171 operational ranges encompassing a total of 98,225 acres should be categorized as Unlikely.

**Installation Data**

- Installation Boundary
- Non-Operational Area

Range Conclusions

- Unlikely
- Programatically Excluded

Hydrology

- Perennial Creek/Stream
- Intermittent Creek/Stream
- Waterbody

For more information on Fort Drum, contact Fort Drum's PAO at usarmy.drumsimcom.mbx.pao1@mail.mil For more information on the DoD Operational Range Assessment Program visit <https://www.denix.osd.mil/orap/home/>