



# Fort Stewart, Georgia

March 2020

## Background

The Department of Defense (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 Stewart occupies approximately 279,271 acres north of the city of Hinesville approximately 40 miles southwest of Savannah spanning across Bryan, Evans, Liberty, Long and Tattnall counties, Georgia. The installation is bordered to the west by U.S. Highway 301/25, to the east by Interstate Highway 95, to the south by State U.S. Highway 84, and to the north by Interstate Highway 16.

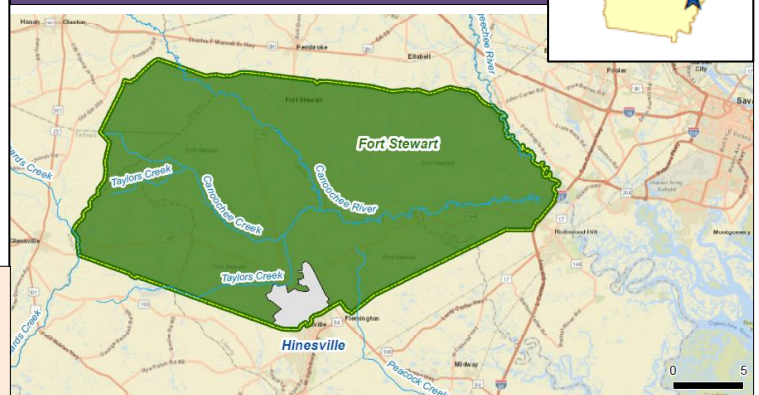
## Operational Range Assessment Findings (02/2020)

Based on observed conditions, updated data, and results of the Advanced Assessment sampling investigation, potential MC associated with the most heavily used ranges at Fort Stewart are not migrating off-range via sediment and do not at pose a risk to off-range human and/or ecological receptors. Copper is migrating via surface water, but the source of copper is not attributed to operational range activities. As shallow groundwater discharges to surface water and the ORA Phase II sampling data indicated that MCOC are not migrating off-range via the groundwater pathway, no groundwater sampling was conducted during the Advanced Assessment and there is no unacceptable risk to off-range human receptors.

## Next Steps

Fort Stewart's operational ranges should be included in the FY23-27 cycle of ORAs to meet DoD Policy (DoDI 4715.14) re-assessment requirements.

## Map of Range/Range Area



### Installation Data

- Installation Boundary
- Operational Area
- Non-Operational Area

### Hydrology

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

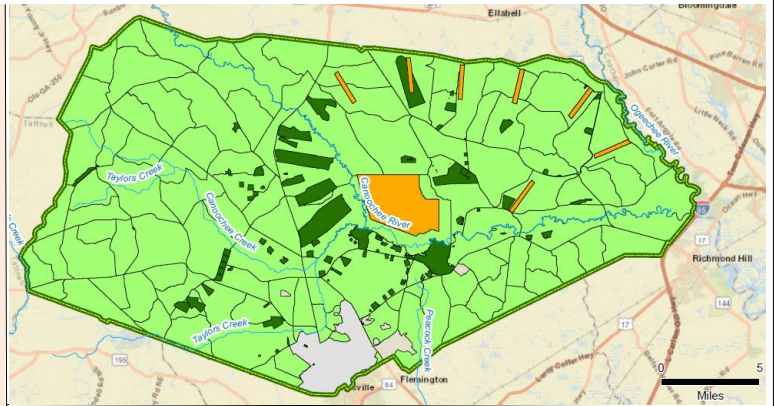
### Range Overview (continued)

Fort Stewart currently utilizes 270 operational ranges, consisting of firing points, firing ranges, impact areas, and maneuver training areas, totaling 271,269 acres. The remaining acreage of approximately 8,000 acres consists of the non-operational cantonment area. There are three primary range complexes with the majority of these ranges organized in a circular fashion, where the live-fire ranges are located around the perimeter and the duded impact areas are located towards the middle of the firing range use area. The small arms ranges are designed with downrange impact berms which receive the majority of the munitions expended in these areas. Larger caliber direct- and indirect-fire munitions are fired into the designated impact areas. The remaining firing points/ranges are spread out across the installation within training and maneuver areas. Historical small arms ranges and impact areas are located throughout the majority of the installation. The Resource Conservation and Recovery Act permitted open burn / open detonation range is programmatically excluded and not evaluated under the ORAP.

### Previous ORA Investigations

The 2008 Phase I ORA evaluated 274 operational ranges consisting of firing points, firing ranges, impact areas, and maneuver training areas, totaling 286,760 acres. The 2008 Phase I ORA concluded that 186 ranges were Unlikely to have a source-pathway-receptor interaction due to the lack of historical and current munitions use. These 88 ranges were categorized as Inconclusive based on the presence of a historical and current source, potential surface water and groundwater migration pathways, and off-range human and ecological receptors and were recommended for further evaluation through a Phase II.

In 2012, the ORA Phase II re-evaluated the Phase I CSM using additional information collected prior to sample collection. Based on this re-evaluation, 30 of the Inconclusive ranges were re-categorized as Unlikely due to the distance (more than 15 miles downstream of the source area for the surface water pathway and 4 miles downgradient for the groundwater pathway) to potential receptors prior to sampling.



### Previous ORA Investigations (continued)

The remaining 58 Inconclusive ranges, encompassing 69,713 acres, were further evaluated through the Phase II sampling investigation. Four watersheds comprise the Inconclusive range areas, but three watersheds (Altamaha Watershed, Canoochee Watershed, and Laurel View Watershed) were selected as representing the worst-case source, pathway, and receptor conditions and were, therefore, the focus of the Phase II investigation.

The Phase II multi-season field sampling was conducted in April 2012 and October 2012. Surface water and sediment samples were collected from six locations (three locations downstream of potential MCOC source areas and three upstream reference locations) within the three watersheds that represented the worst-case scenario for potential MCOC migration from the Inconclusive ranges. Groundwater samples were collected from four newly installed monitoring wells located along the southeastern installation boundary.

Based on data collected as part of the Phase II investigation, no MCOC were migrating off-range at concentrations that posed an unacceptable risk to human health or the environment. Fort Stewart's Inconclusive ranges were re-categorized as Unlikely for the following reasons:

- No explosives were detected in any surface water, sediment, or groundwater samples; no perchlorate was detected in any surface water or groundwater samples
- No 95 percent UCLM concentrations of metals in surface water exceeded their associated potable water screening levels

Previous ORA Investigations (continued)

- The 95 percent UCLM concentrations of copper and lead in surface water at SWS-04 (Canooshee River) and SWS-02 (Canooshee River reference location) exceeded their associated freshwater ecological screening levels; however, the average downstream concentrations were not significantly greater than the average reference concentrations
- The 95 percent UCLM concentrations of copper in surface water at SWS-06 (Pineview Lake) and SWS-01 (Glisson's Mill Pond; reference location for SWS-06) exceeded the associated freshwater ecological screening level; however, the average downstream concentration was not significantly greater than the average reference concentration
- No 95 percent UCLM concentrations of metals in sediment exceeded their associated freshwater ecological screening levels; however, the average downstream concentrations of lead at SWS-04 (Canooshee River) and SWS-06 (Pineview Lake) significantly exceeded their respective average reference concentrations
- Simultaneously extracted metals (SEM)/Acid volatile sulfide (AVS) results indicated that metals were not expected to cause direct toxicity to benthic organisms within sediment
- Detected concentrations of metals in groundwater were less than the potable screening levels and less than the lower bound of the range of uncertainty, indicating that metals are not migrating via groundwater at concentrations that pose an unacceptable risk to off-range human and/or ecological receptors
- Overall weight-of-evidence and statistical analysis indicated that elevated concentrations of lead and copper in surface water are not attributable to range activities; therefore, there is no unacceptable risk to off-range human and/or ecological receptors
- Overall weight-of-evidence and statistical analysis also indicated and that lead is migrating via sediment in the Canoochee River and Pineview Lake; however, there is no unacceptable risk to off-range receptors to off-range human and/or ecological receptors.

ORA Advanced Assessment (2019)

For the Advanced Assessment, the CSM developed during the Phase II was updated and a sampling approach that included multi-season surface water and/or sediment sample collection from six total locations; three downstream locations and three upstream reference locations, was developed. No groundwater sampling was conducted based on the updated CSM that indicates groundwater flow from the surficial aquifer likely enters surface water bodies as baseflow in areas adjacent to perennial streams. Furthermore, the ORA Phase II sampling data indicated that MCOC are not migrating off-range via the groundwater pathway.

For surface water at the tidal sampling location, SWS-04 (River Landing 25), no detected concentrations of antimony, copper, or zinc exceeded their respective freshwater ecological screening levels) and no average downstream concentrations of those MCOC significantly exceeded average reference concentrations in surface water.

While the 95 percent UCLM for lead exceeded the ecological screening level, the average downstream concentration is not significantly greater than the average reference concentration. Additionally, the 95 percent UCLM for lead was determined to be artificially inflated due to the variance between the individual sample concentrations (0.117 µg/L, 0.547 µg/L, and 0.226 µg/L). The average concentration of lead (0.297 µg/L) is more representative of actual site concentrations and is less than the freshwater ecological screening level (0.356 µg/L), indicating that MCOC are not migrating from the operational range area to off-range areas via surface water at SWS-04 (River Landing 25) and there is no unacceptable risk to off-range human and/or ecological receptors.

For surface water at the perennial sampling location, SWS-06 (Pineview Lake), no detected concentrations of antimony or zinc exceeded their respective freshwater ecological screening levels and the average downstream concentrations for antimony and zinc were not significantly greater than average reference concentrations in surface water.

ORA Advanced Assessment (2019) (continued)

The 95 percent UCLM for copper and lead in surface water exceeded their respective freshwater ecological screening levels; however, only the average downstream concentration of copper significantly exceeded the average reference concentration in surface water. Since the average downstream concentration of lead is not significantly greater than the average reference concentration, the elevated 95 percent UCLM for lead at SWS-06 (Pineview Lake) is not attributable to range activities. A weight-of-evidence evaluation indicated that the copper exceedances at SWS-06 (Pineview Lake) are not attributable to current or historical range activities based on the lack of identifiable source area associated with metals MCOC and periodic copper sulfate herbicide applications (contributing source). Therefore, the elevated downstream concentration of copper is not attributable to range activities.

Although the elevated concentrations of lead and copper are not attributable to range activities and are therefore not addressed under ORA, these exceedances should be further evaluated by the installation under another program.

For sediment at all locations, no detected concentrations of antimony, copper, lead, or zinc exceeded their respective freshwater ecological screening levels (individual or 95 percent UCLM) and no average downstream concentrations significantly exceeded average reference concentrations, which indicates that MCOC are not migrating from the operational range area to off-range areas via sediment and there is no unacceptable risk to off-range ecological receptors. Additionally, for all downgradient locations, the  $\Sigma\text{SEM}/\text{AVS}$  ratios are less than 1 and the normalized  $\Sigma\text{SEM}-\text{AVS}/f_{\text{oc}}$  ratios are less than  $130 \mu\text{mol}/\text{g}_{\text{oc}}$ , which indicates that divalent metals should not cause direct toxicity to benthic organisms.

For more information on Fort Stewart, contact Fort Stewart's PAO at [usarmy.stewart.3-id.list.pao@mail.mil](mailto:usarmy.stewart.3-id.list.pao@mail.mil)  
For more information on the DoD Operational Range Assessment Program visit <https://www.denix.osd.mil/orap/home/>