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# FINAL
# OPERATIONAL RANGE ASSESSMENT PROGRAM REPORT
# FORT STEWART, GEORGIA

To meet Department of Defense (DoD) requirements and support the U.S. Army's Sustainable Range Program, the Army is conducting the Operational Range Assessment Program (ORAP) to determine whether a release or substantial threat of release of munitions constituents of concern (MCOC) from an operational range to an off-range area creates a potentially unacceptable risk to human health or the environment. The initial ORAP assessment—Phase I—is a qualitative evaluation of whether: (a) a MCOC source existed on the operational range footprint, (b) there is a potential migration mechanism, and (c) human or sensitive ecological receptors are present. Conclusions from the Phase I place each operational range into one of two categories: Unlikely or Inconclusive. Operational range areas categorized as "Unlikely" are those where there is sufficient evidence to show that there are no known releases or source-receptor interactions that could present an unacceptable risk to human health or the environment, based on a review of the information available; no further action needs to be taken for these ranges at this time and the installation is placed into a periodic 5-year review cycle. Operational range areas categorized as "Inconclusive" are those where existing information either is insufficient to make a source-receptor interaction determination, or indicates the potential for such interaction to be occurring. Sites with ranges categorized as Inconclusive are recommended for further evaluation by conducting an ORAP Phase II assessment.

The ORAP Phase II assessment re-evaluates whether the source-receptor pathway identified during Phase I is complete, identifies any new information that may impact the Phase I's conclusions, and as necessary involves a quantitative assessment consisting of the collection and laboratory analysis of environmental media to determine whether MCOC are potentially leaving an operational range footprint by an identified pathway (e.g., groundwater or surface water) and pose a potential risk to off-site receptors.

This ORAP Phase II Report assesses source-receptor pathways identified at Fort Stewart, Georgia. EA Engineering, Science and Technology, Inc. (EA) conducted this evaluation under contract W9128F-10-D-0056 to the U.S. Army Corps of Engineers (USACE)-Baltimore District.

Fort Stewart occupies 279,471 acres in southeastern Georgia, directly north of the City of Hinesville. Fort Stewart currently utilizes 274 operational ranges totaling 271,189 acres. The ranges include dudded and non-dudded impact areas, an open burn / open detonation range, firing ranges, firing points, and maneuver and training areas. Historical impact areas and small arms ranges overlap operational ranges throughout the installation. The remaining 8,282 acres consist of non-operational area, including the cantonment area. The Resource Conservation and Recovery Act permitted open burn / open detonation range is programmatically excluded and not evaluated under ORAP.

The Phase I completed for Fort Stewart in 2008 categorized 88 of the 274 operational ranges as Inconclusive due to potential surface water and/or groundwater pathways (Malcolm Pirnie, 2008). The 88 Inconclusive ranges totaled 118,200 acres and consisted of firing points, firing ranges, impact areas, and maneuver and training areas.

During the conduct of the Phase II, and based on additional information gathered during the Phase I review and Phase II site reconnaissance, 30 operational ranges categorized as Inconclusive were re-

categorized as Unlikely. These ranges were re-categorized as potential MCOC migration pathways from the operational range boundary to off-range receptors exceeded the programmatic 15 mi for surface water and 4 mi for groundwater.

Based on additional information gathered during the Phase II site reconnaissance, 30 of the Phase I Inconclusive operational ranges were re-categorized as Unlikely because the MCOC migration pathways from the operational range boundary to off-range receptors exceeded the programmatic 15 miles for surface water, and four miles for groundwater. As a result 58 operational ranges totaling 69,713 acres were evaluated under the Phase II.

Phase II multi-season field sampling was conducted at Fort Stewart during April 2012 and October 2012. Surface water and sediment samples were collected from six locations within three watersheds at Fort Stewart: three locations downstream of potential MCOC source areas and three reference locations. Four rounds of surface water samples were collected from four of the six locations (two downstream and two reference locations) and two rounds of surface water samples were collected from the remaining two locations (Peacock Creek and the associated reference location). Three rounds of sediment samples were collected from all six surface water sampling locations. One round of groundwater samples were collected from four newly installed monitoring wells located in one watershed along the southeastern installation boundary. Surface water, sediment, and groundwater samples were analyzed for explosives, metals (i.e., antimony, copper, lead, and zinc); and standard water quality parameters. Matrix-specific analytes included perchlorate in surface water and groundwater and total organic carbon and simultaneously extracted metals / acid-volatile sulfides in sediment.

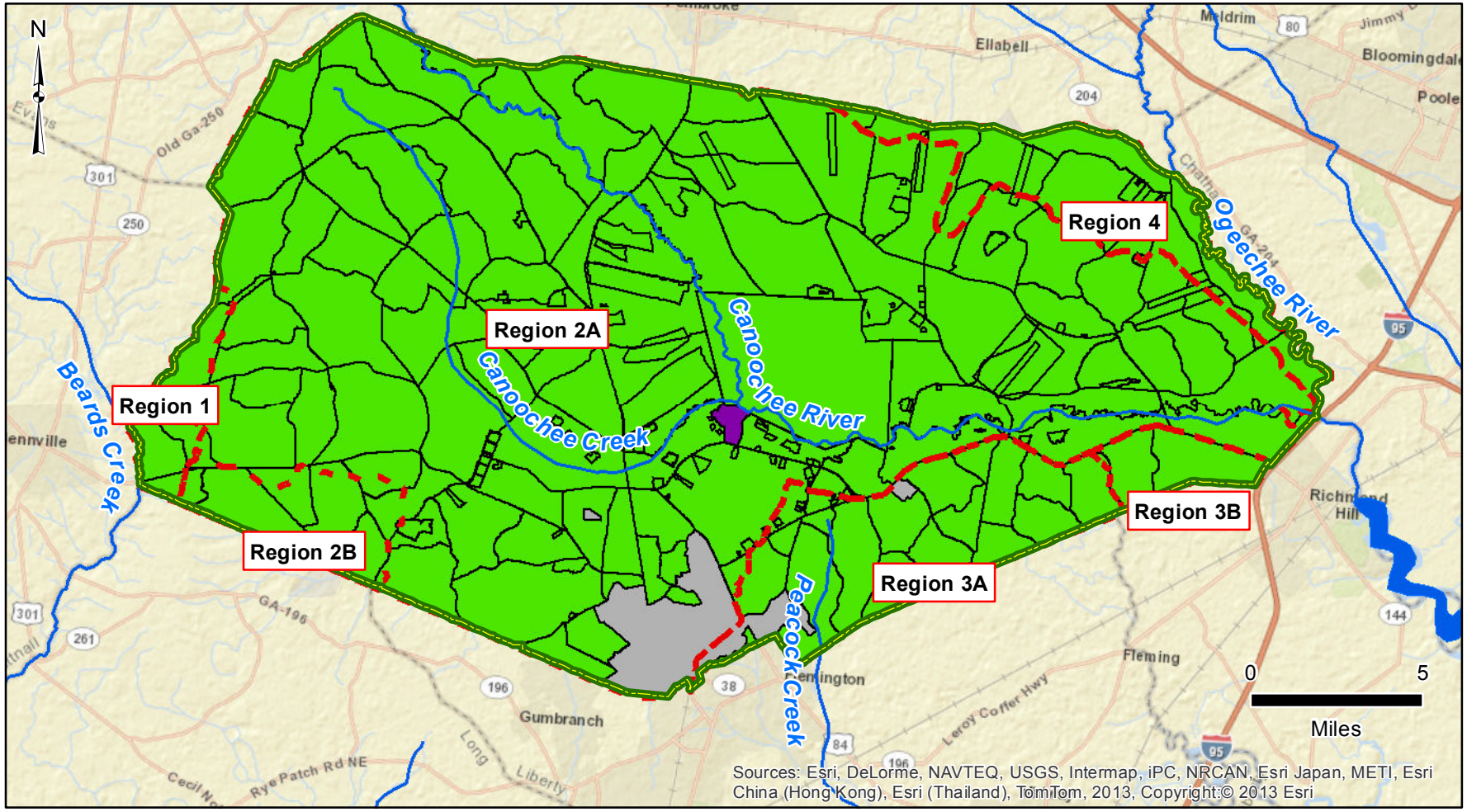
Surface water and sediment sample results were compared to reference concentrations using a *t*-test of average concentrations and the 95 percent upper confidence limit of the mean sample concentrations were compared to Range and Munitions Use Subcommittee (RMUS) screening levels. Because only two surface water samples were collected from Peacock Creek and the associated reference location, the additional statistical analysis was not performed at these locations. Instead, surface water analytical results from Peacock Creek were compared directly to RMUS screening levels and reference concentrations. For groundwater, individual sample results were compared to RMUS screening levels and to a range of uncertainty. The range of uncertainty was established as plus or minus an order of magnitude around the screening level for organic compounds, and based on combined accuracy and precision values for inorganic compounds.

No explosives or perchlorate were detected in any surface water or groundwater samples, and no explosives were detected in any sediment samples. For all sampling locations, the 95 percent upper confidence limit of the mean concentrations for metals in sediment did not exceed associated freshwater screening levels. For surface water, no 95 percent upper confidence limit of the mean concentrations for metals exceeded potable water screening levels. Average downstream concentrations of metals in surface water from two downstream locations were not statistically greater than average reference concentrations, and/or the 95 percent upper confidence limit of the mean concentrations did not exceed associated freshwater screening levels. Lead in surface water samples at both the downstream Peacock Creek sampling location and the associated reference location was the only analyte that exceeded RMUS screening levels. The highest lead concentration was detected at the reference location and the average reference lead concentration was greater than the average downstream concentration, which suggests that the source of lead in surface water is not attributable to the Inconclusive ranges upstream of Peacock Creek. For all groundwater sampling locations, metals concentrations were below potable screening levels and less than the lower bound of the range of uncertainty. Therefore, MCOC is not migrating from the Inconclusive ranges at levels that pose an unacceptable risk to off-range human and ecological receptors located downstream.

In summary, the ORAP Phase II assessment for Fort Stewart concludes that no MCOC are migrating from operational ranges at concentrations that pose an unacceptable risk to off-range human and or ecological receptors. The operational ranges at Fort Stewart are categorized as Unlikely and placed into a periodic review program (**Figure 1**).

Operational Range Assessment Program
Phase II Quantitative Assessment
Fort Stewart, Georgia

# Figure 1
# Summary of Phase II Conclusions


**Installation Data**
- Installation Boundary
- Non-Operational Area
- Excluded

**Recommendation**
- Operational Range - Periodic Review

**Hydrology**
- River/Stream
- Water Body
- Watershed Boundary

Data Sources:
ArcGIS Map Service 2013
Fort Stewart Directorate of Public Works 2011

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