

# Managing the Range Environment for Infantry Training

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Soldiers training on Fort A.P. Hill, Virginia, may not realize it, but over the past two years, installation land managers have been capitalizing on its resident Integrated Training Area Management (ITAM) program to maintain sustainable range operations in support of infantry training. Specifically, through the Land Condition Trend Analysis (LCTA) program, a series of environmental assessment procedures have been developed to understand the relationship between environmental impacts from live-fire infantry training, the consequences of those impacts to range operations, and the long-term sustainability of natural conditions on specialized training facilities used for Infantry training.

The latest assessment conducted by the installation LCTA program occurred on Range 26; an Infantry Squad Battle Course (ISBC). The ISBC is a specialized training facility that is more than 90-percent forested and spans approximately 300 acres (121.5 ha). The facility includes a series of objectives (designated Alpha – Echo), which Infantry units assault as part of their training experience. Though no two objectives are identical, they typically consist of either stationary or mobile armored targets, and/or stationary or mobile infantry targets (Figure 1). Pine and hardwood forests surround all of the objectives on the ISBC.

**Figure 1 - Mobile armored target**



Situated among the various objectives are large trees that were intentionally left standing following the development of the facility. The trees offer tactical cover and concealment to Soldiers while they assault the objectives as well as to provide for a more realistic training experience (Figure 2).

Additional support for units training on the ISBC is offered through designated assembly areas, after action review sites, and a helicopter-landing zone. The facility as a whole offers a training scenario reflecting real-world conditions in a woodland setting.



**Figure 2 - Trees located among the objectives offering tactical cover and concealment**

In the course of managing the facility, range and land managers observed that munitions fired on the range would travel beyond and through the targetry dispersing into the surrounding forests. It was the impacts of those munitions on the forest and the subsequent impacts to range operations that were the focus of the assessment. While a comprehensive survey of forest conditions were part of this assessment, the most important features to range sustainability and operations were:

- Tree health and mortality,
- Forest debris accumulation, and
- Horizontal concealment.

Determining the extent of tree health and current mortality rates provides information on how likely an area is to be sustained by forest cover for training realism, while information on debris accumulation is desired due to its effect on the severity of range fires; a frequent and common occurrence. Horizontal concealment is part of the doctrinal requirement that must be met for infantry training.

LCTA used in-house techniques and methods from the United States Forest Service to conduct the assessment. Data on damage and mortality was collected on the trees scattered among the objectives, while data on mortality, downed debris, and concealment were collected on the forests behind the objectives. The latter was collected along a gradient; from the forest edge (closest to the objectives), to forest interior (approximately 50 meters away), and stopping at the forest deep interior (approximately 75-100 meters from the objectives). This



**Figure 4 - Open wounds created by repeat munitions fire on the ISBC**

comparison allows for trend analysis along the same gradient munitions travel and disperse.

LCTA discovered that 29 percent of the trees scattered among the objectives were already dead with between 25-39 percent likely to die within the next 10 years based on tree crown health. An even higher estimate may be possible given the high incidence of munitions damage to their stems further increasing stress and disease susceptibility (Figure 4). Munitions damage is the likely reason for tree condition given that 77 percent of the trees had observable bullet wounds.

We also learned that 33 percent of the trees along the woodline adjacent to the objectives were dead but still standing; three fold what land managers consider acceptable levels of mortality. The expected rates of mortality may be upwards of 27 percent depending on what distance from the objectives is of interest.

The presence of standing dead trees among the objectives and at the forest edge are directly hazardous to units training since they could conceivably fall during a



**Figure 5 - Coarse woody debris in the woods adjacent to the ISBC**



**Figure 6 - LCTA plots in an area frequented by forest fires**

training exercise and are also indirectly hazardous because once they fall they accumulate into debris piles. Forest fires occur regularly on Range 26, either from lightning strikes, prescribed burning by land managers, and sometimes even from units firing tracer rounds. If training activities increase, debris accumulation then they subsequently may increase the intensity and severity of future forest fires. Since units must cease their training exercises if a fire breaks, managing for debris may assist in increasing range availability. Approximately 23 tons per acre of debris were found along the woodline; three times more than what land managers consider acceptable conditions (Figure 5).

Understory vegetation is a principal component of horizontal concealment and

was found to be highest at the forest edge (58 percent) steadily decreasing into the forest deep interior (44 percent). This pattern is beneficial to training requirements because units have the concealment they need prior to assaulting the objectives. Concealment was also found to be affected by past range fires, indicating the importance of using fire to manage vegetation on a range facility (Figures 6).

Too little concealment detracts from the training experience; too much and it can impede units traversing the forests to assault the objectives.

The assessment conducted by LCTA has provided valuable insights on the interaction between the environment and infantry training that can be applied to sustaining this range. Cover and concealment around the objectives are anticipated to decrease in the coming years due training activities. Range managers now have that knowledge to be proactive and develop alternative means of cover and concealment to support infantry training before the need for them arises. Additionally, range managers can incorporate forest debris accumulation and horizontal concealment requirements into the sustainable management of the facility.

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