Assessing Forest Health Across U.S. Army Installations Using Sentinel-2 Imagery

UNITED STATES MILITARY ACADEMY
WEST POINT®

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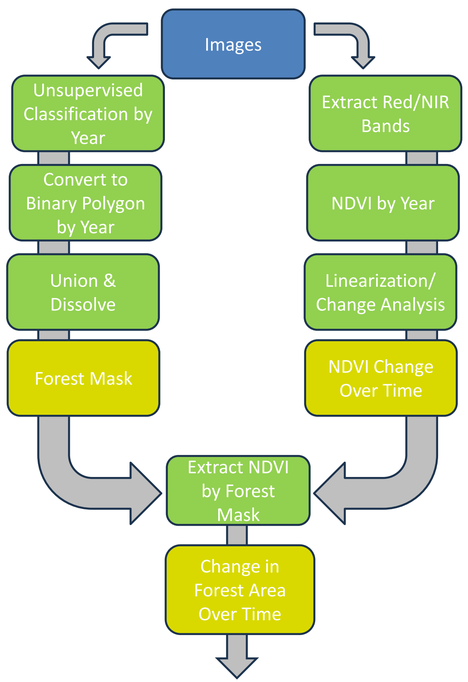
Introduction

Preparing soldiers for combat is the responsibility of the leaders within our United States Army. This requires realistic training locations to best simulate what soldiers can expect to see in combat. Forests are the life blood of that realistic setting. Our Army needs realistic, thriving forests to best simulate the conditions soldiers may meet in austere, forward deployed environments

Objective

How has the extent and health of forests within US Army installations changed over time and in significant cases of change, what is the cause?

Methods



Results

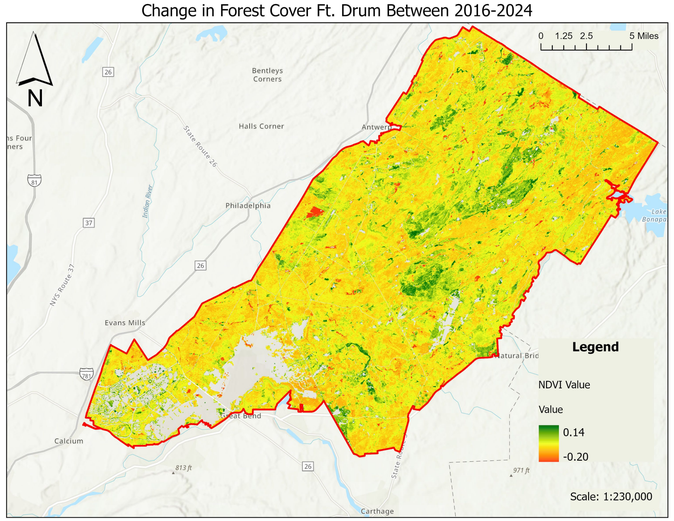


Figure 1: NDVI Change in Ft. Drum

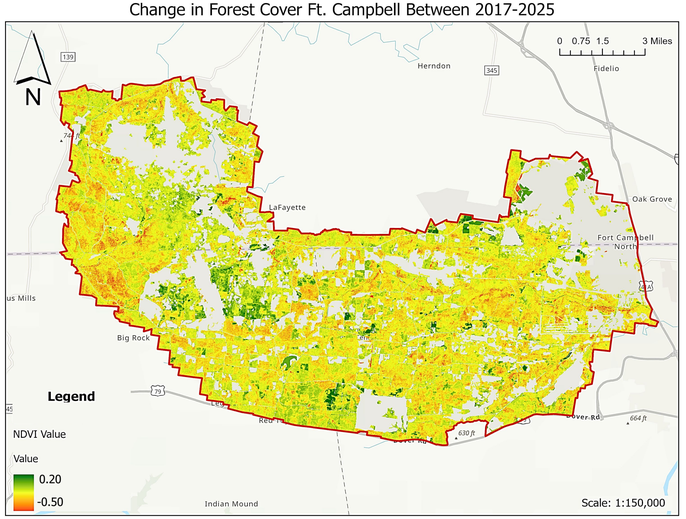


Figure 2: NDVI Change in Ft. Campbell

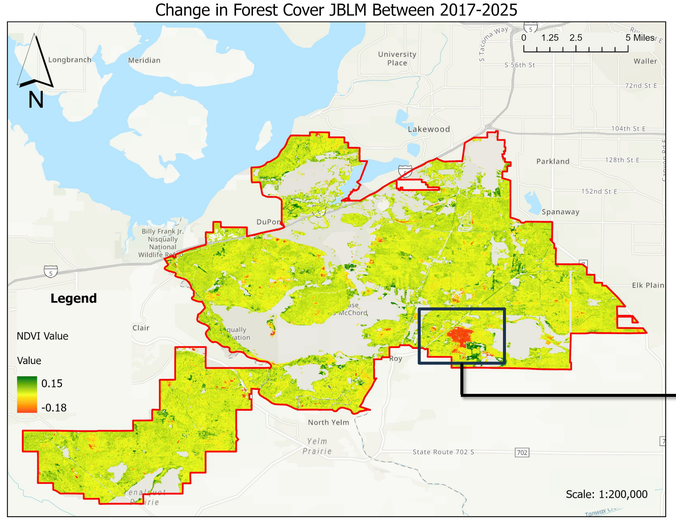


Figure 3: NDVI Change in JBLM

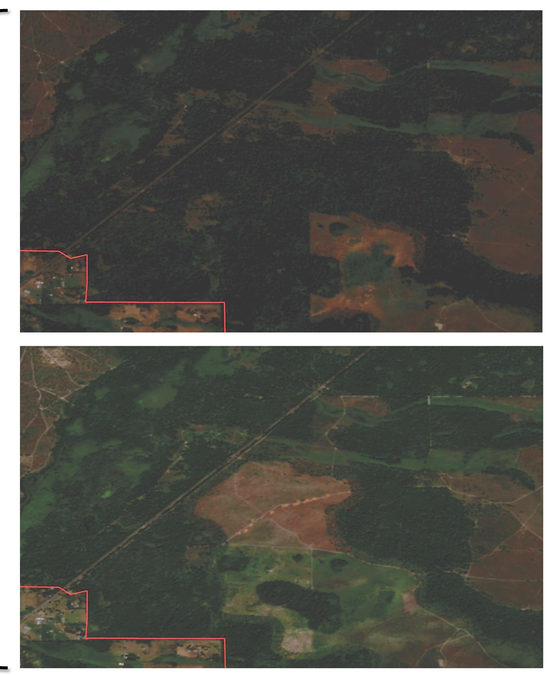


Figure 4: Example of Significant Area, Forest Loss in Southeast JBLM

Scan For More Information (CUI)

Image Data: European Space Agency, Copernicus Sentinel-2

Discussion

Within these figures, green, red, and yellow represent changes in NDVI over time. Where green indicates areas of positive change, red indicates areas of loss, and yellow represents little change. Overall, there was no drastic change in forest health across these military installations over the ten-year period. However, areas where new training zones were developed tend to show up in red, indicating a decrease in vegetation. Furthermore, there is a small trend observed at both Fort Campbell and Fort Drum where many training areas show higher NDVI values. This suggests that these areas are healthy vegetation. There are several possible reasons for this pattern, and it highlights the importance of understanding how land use impacts vegetation over time. Which can overall impact a commander's decisions.

Conclusion

It is feasible to evaluate the health of forests across Army installations by using Sentinel-2 imagery and the Normalized Difference Vegetation Index. This workflow facilitated the detection of significant forest growth or loss. JBLM shows little change in overall forest health, while Ft. Campbell and Ft. Drum exhibit more noticeable change. Healthier areas reflect more upkeep, whereas others receive less attention. Overall, changes in forest health are primarily driven by either development or the level of upkeep.