



Background:

In recent decades, national wildfire size and severity has increased dramatically, more than doubling that observed in the 1980s. The military is susceptible to a wide range of wildfire impacts, including damage to installation infrastructure and resources as well as impacts to neighbors. But there is very limited data with which to assess the level of wildfire exposure at each installation. National and installation-level wildfire occurrence data varies widely in completeness and accuracy, making data-driven assessments of the wildfire threat difficult at the regional and national level. This information is critical, as understanding the location and nature of the problem is required to effectively solve it.

Objective:

The primary goal was to triage installations relative to others within each military branch and across branches using the relative number, size, and location of remotely detected wildfires. By triaging the wildfire hazard, regional and national-level fire managers will have information founded in consistent national data about the wildfire threat faced by the Department of Defense (DoD) that can be used to inform wildfire mitigation resourcing.

Summary of Approach:

In collaboration with Legacy Service Level Managers, we identified 145 installations to include in the study across the Air Force (40), Army (54), Marine Corps (14), and Navy (37). We detected wildfires using a consistent methodology throughout the U.S. to produce comparable data across the Air Force, Army, Navy, and Marine Corps. At each installation, we used 11 years of Landsat imagery, calculated the differenced normalized burn ratio and used heads-up digitizing to delineate fire perimeters. Not every fire can be detected in this fashion, but this produced a dataset with a consistent methodology across the entire study area. Prescribed fires were identified using a decision tree methodology with 82% accuracy and removed from the analysis. Ten wildfire characteristics discernable from the fire perimeter were calculated. These included measures such as the total number of wildfires detected, how many crossed the installation boundary, and the proportion of the installation area burned over the study period. Each installation was compared to the others based on a normalized value of each metric. We grouped installations with similar wildfire metrics

using K-means cluster analysis. Groups were subjectively assigned a wildfire hazard level of high, moderate, low, or negligible based on group characteristics. We then used subject matter expertise to individually review each installation in every group, as well as statistical outliers, to refine individual installation classifications. We carried out this grouping and triaging process within each military branch, as well as across all four branches, producing five triaged lists of installations.

Benefit:

An installation's triage level can be used as one factor to help inform wildfire mitigation decision-making at the DoD or branch level, improving fire outcomes and reducing impacts to training and resources. Individual or combinations of metrics can be used to address issues at a specific installation or group of installations. Installations with a high ranking in this study likely require additional resourcing or study to better address fire mitigation needs. Additionally, this study identified installations that likely have little or no wildfire liability, and therefore can be expected to require little wildfire mitigation, increasing wildfire resourcing efficiencies.

Accomplishments:

Eleven years of Landsat data was analyzed at 145 installations throughout the Air Force, Army, Marine Corps, and Navy. This produced geodatabases of 5,291 detected wildfires, including 1,046 near the installations, and 113 transboundary wildfires. An additional 15,621 fires were detected that were determined to be prescribed fires. This data will be made available as a geodatabase. Through an analysis of 10 wildfire metrics, the cross-branch triaging process identified 13 installations with high wildfire hazard, including nine from the Army, three from the Air Force, and one from the Marine Corps. An additional 31 installations were assigned to the moderate wildfire hazard category. Identifying installations with high and moderate wildfire hazards will increase the ability of national wildland fire managers to focus resources and make data-driven wildfire management decisions.

Contact Information:

Andrew Beavers
Wildland Fire Program Manager
Center for Environmental Management of Military Lands
1490 Campus Delivery, CSU, Fort Collins, CO 80523
970-491-1005
andrew.beavers@colostate.edu

