

# Identifying Oak Tree Mortality Using Image Analysis for The Wildlands Conservancy in Central California



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## Background

In California, oak trees are native, and cover 20 million acres of land. California has been in drought for the last ten years. Based on USFS Aerial Detection Survey report, due to drought and related factors, more than 129 million trees have died since 2017.

## Solution

Python geoprocessing tools were developed to monitor change using a consistent NDVI value in different seasons. Using high resolution drone images, dead and stressed oaks were identified.

## Problem

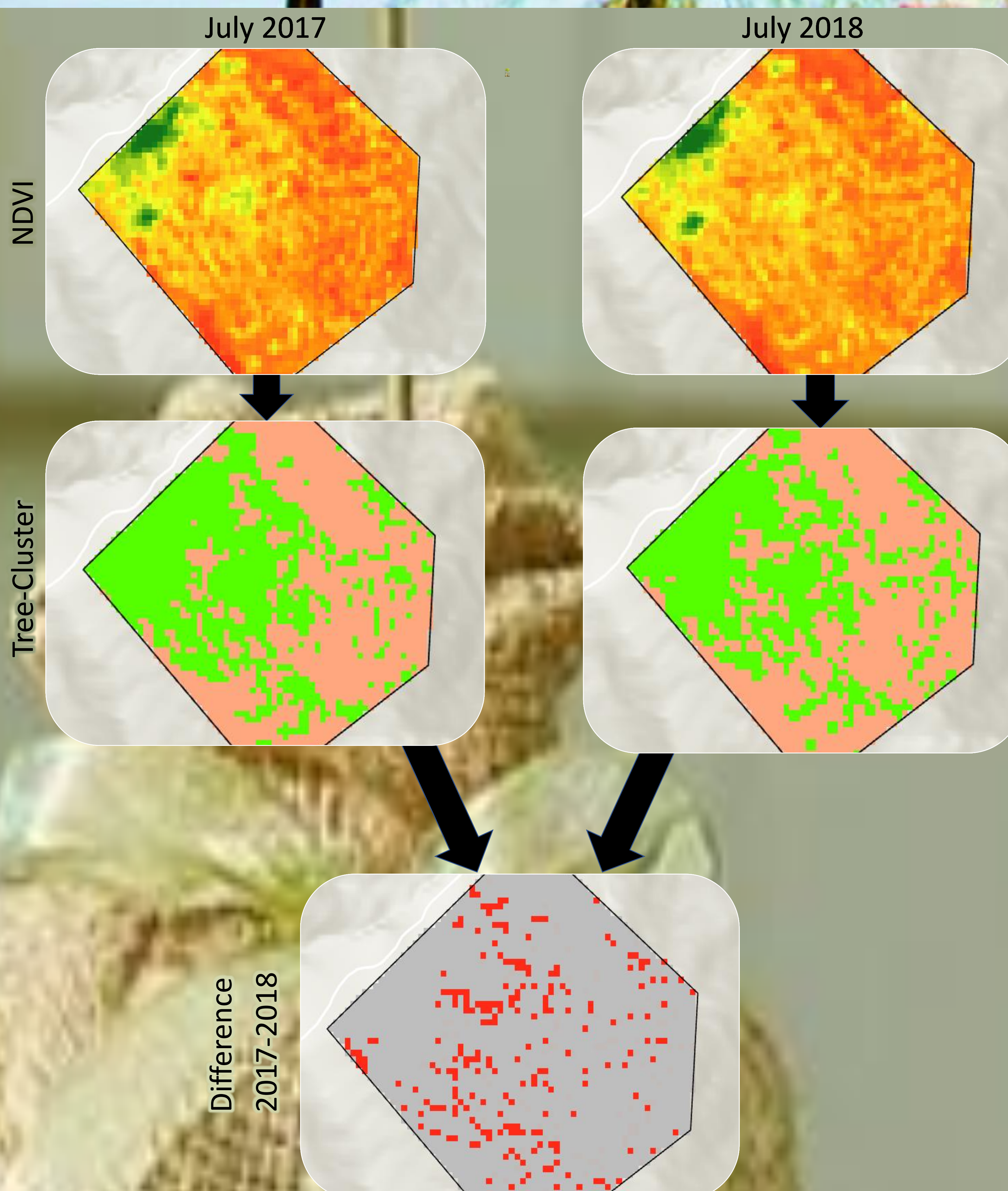
The Wildlands Conservancy's Wind Wolves Preserve has an area of 93,000 acres. A significant portion of the preserve's area is oak tree habitats. The health of the oak trees needs to be assessed. To trace and map oak's health, field data collection is expensive, time-consuming, and tree locations may not be accessible for field survey.

## Results

The project identified dead and stressed oaks in high resolution drone images. Satellite images showed clusters of trees but were unable to identify dead oak trees due to resolution limitations.

## Methods

Using NDVI as a Parameter with multi-scale image analysis, the project was able to locate areas of stressed and dead oaks.



## Conclusion

Sentinel-2 data at 10m resolution was better than Landsat-8 at 30m. Satellite images were insufficient to indicate areas of stressed and dead tree-clusters in very sparsely located trees due to spectral blend with different objects. Thus, resolution is a very determinant factor in identifying dead and stressed trees.

