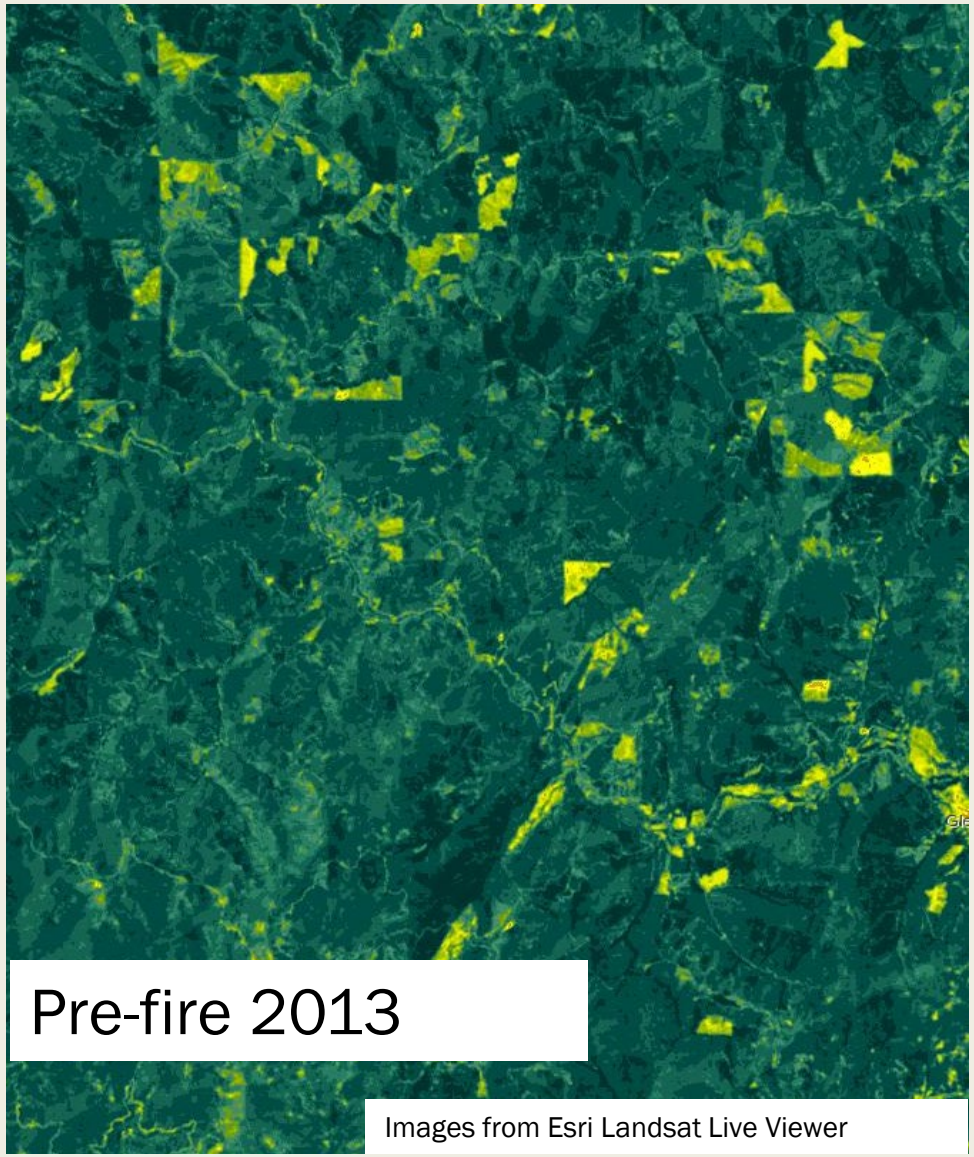
VEGETATION ANALYSIS OF FIRE-AFFECTED REGION IN THE CONTEXT OF LAND MANAGEMENT

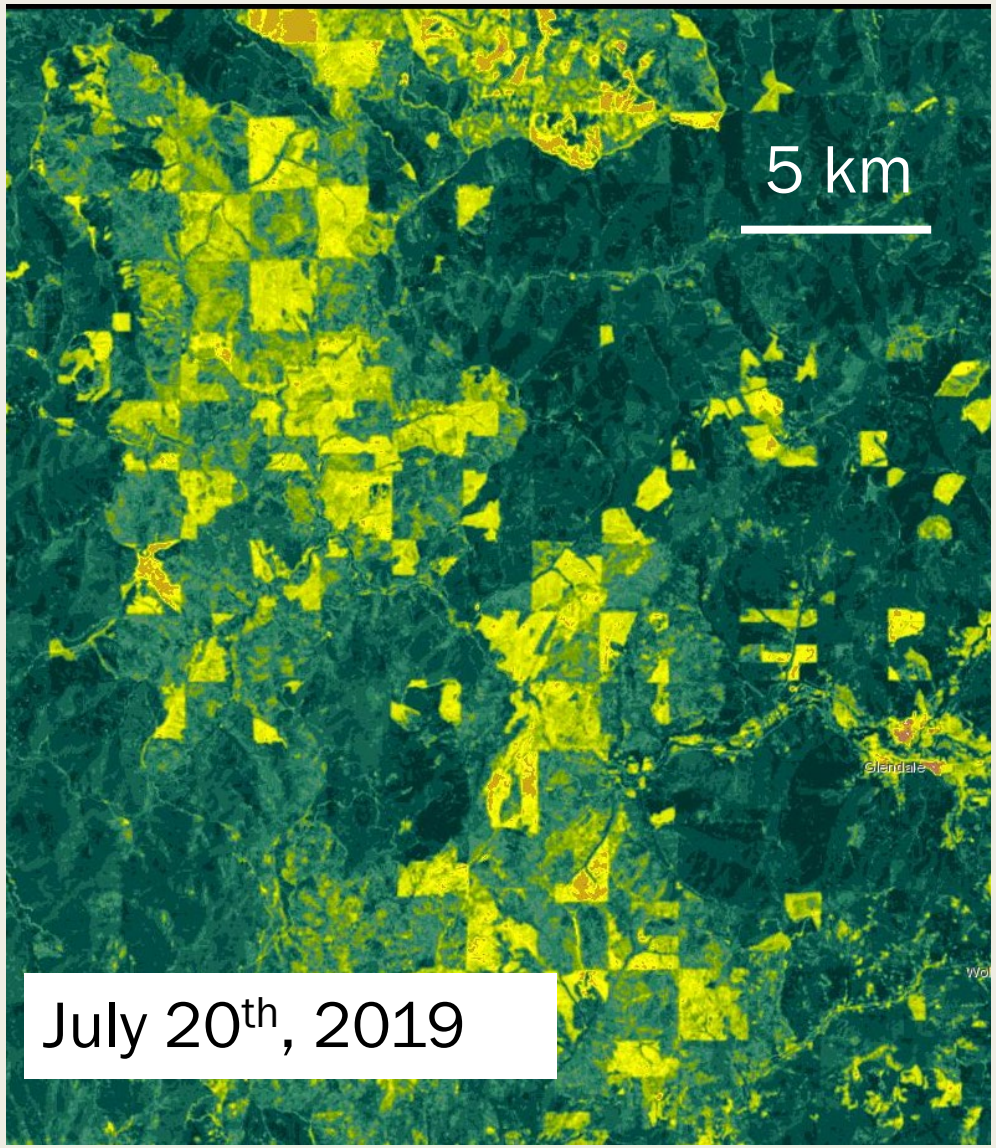
By Brooke Hunter and Jon Sheppard

Douglas Fire Complex (2013)

NDVI Images

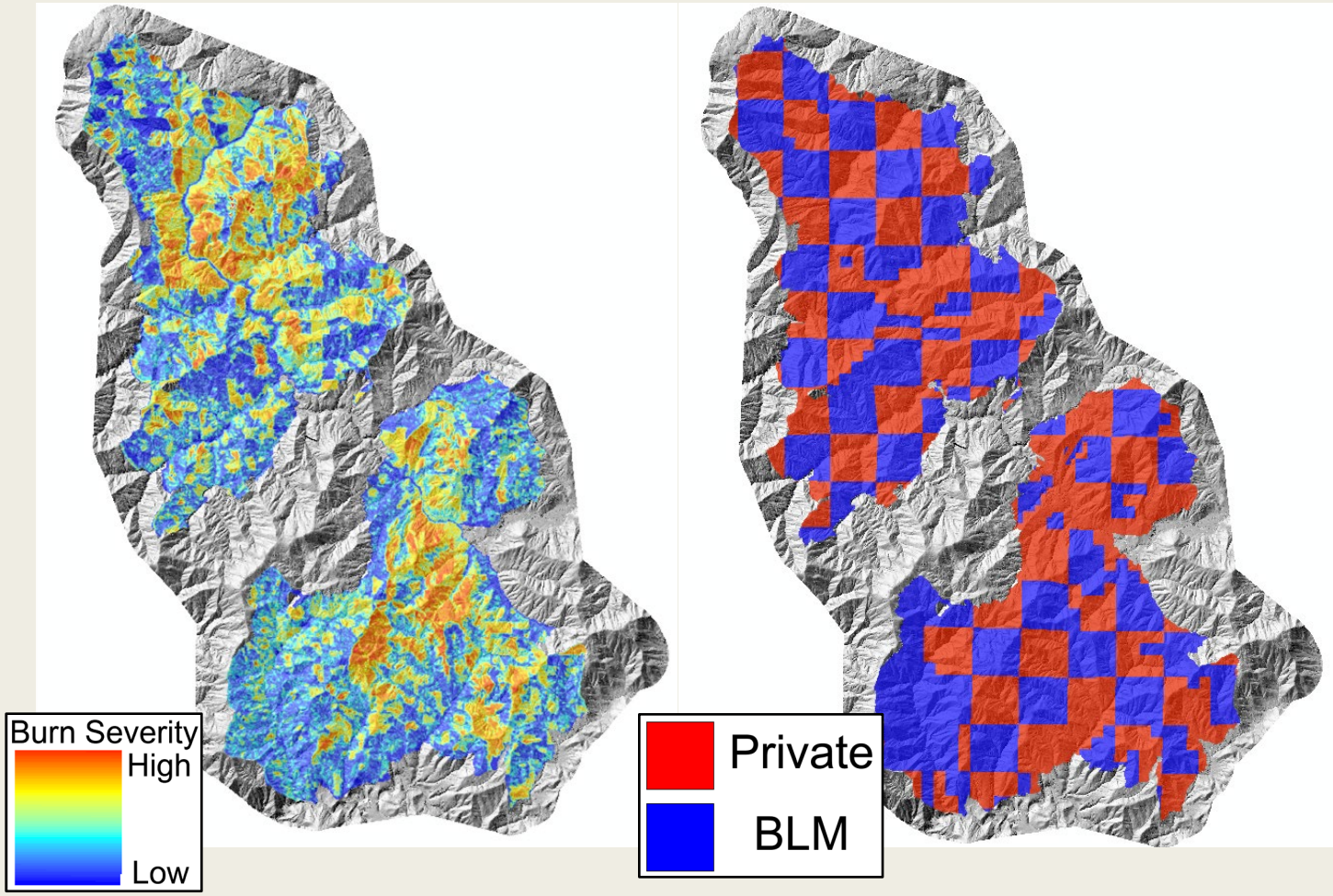


Images from Esri Landsat Live Viewer



Motivation

- Wildfire frequency and intensity has increased in recent years.
- In Oregon, a checkerboard of privately and publicly owned land has resulted in a landscape that has sharp boundaries between clear cut and vegetated regions.
- Vegetation can be important to hillslope recovery



Zald and Dunn 2018

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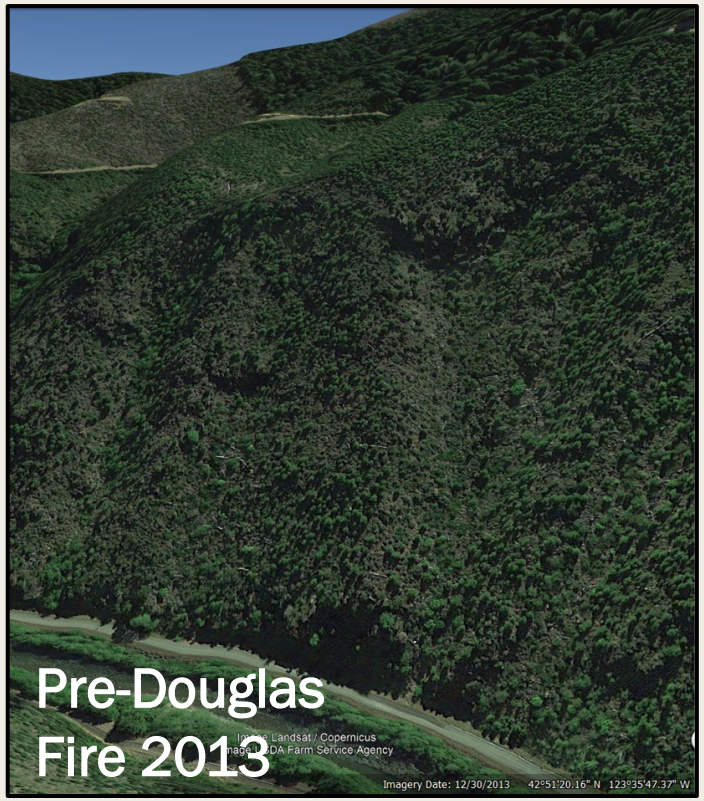
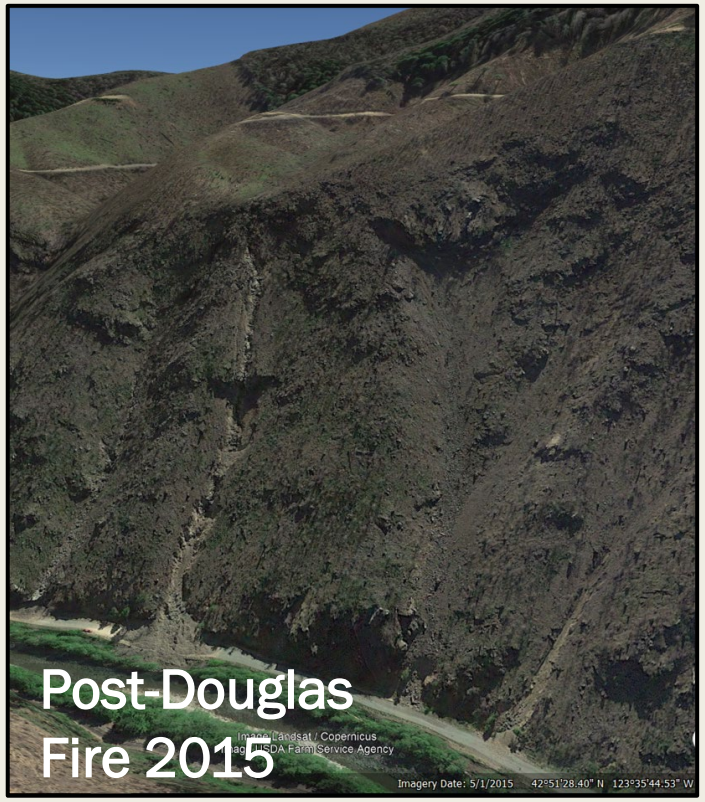
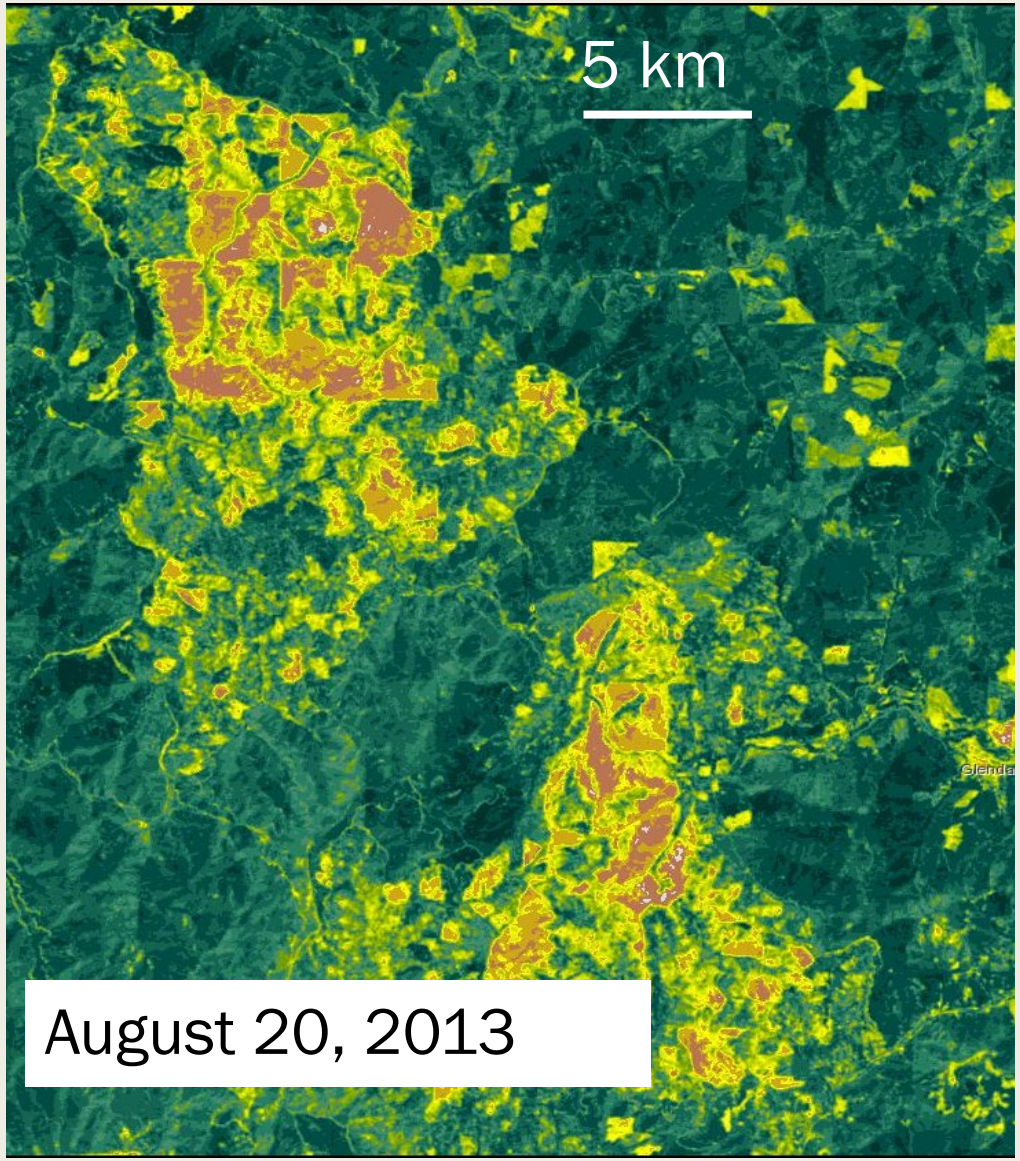




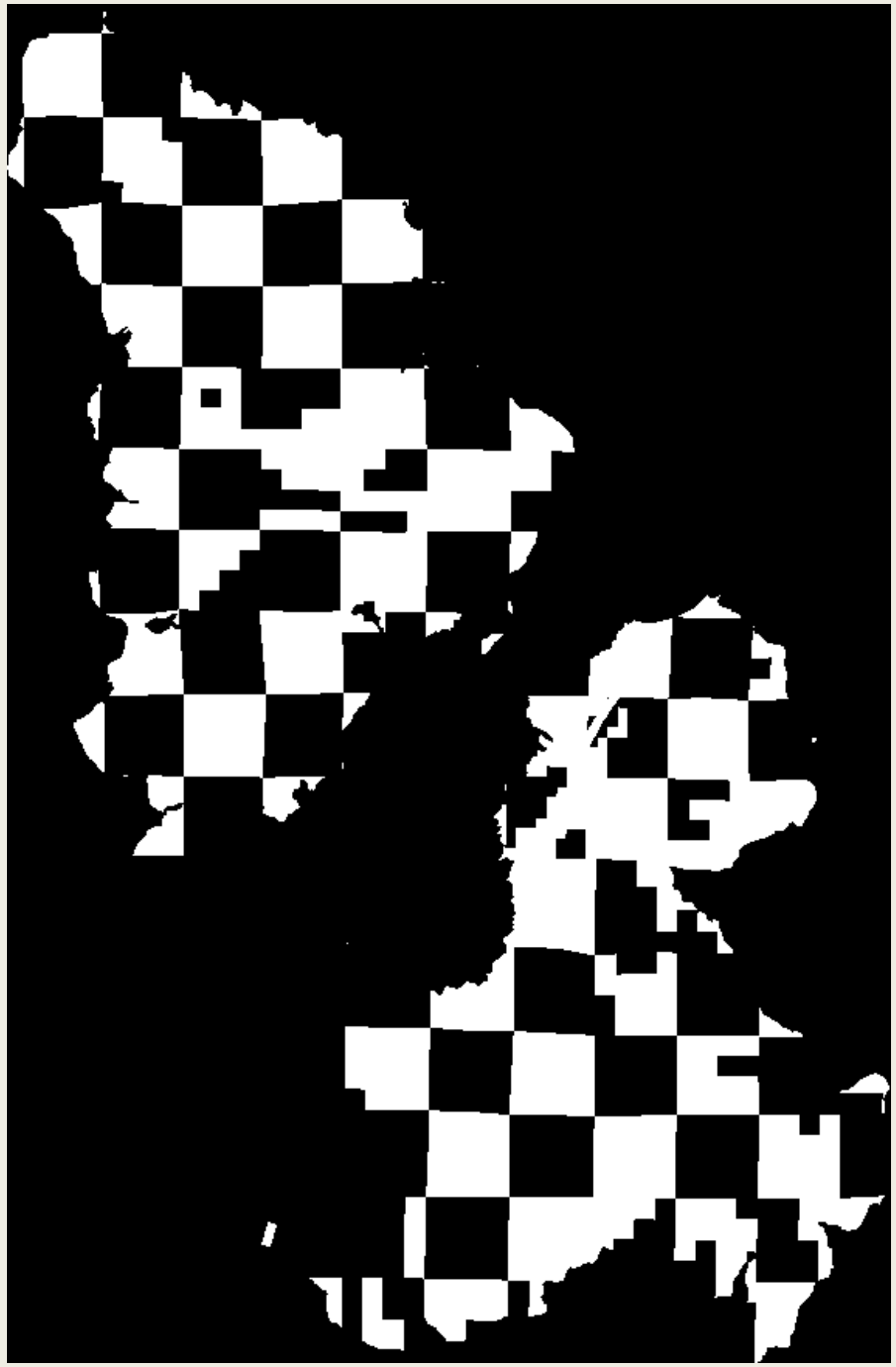
Goal and Questions

- Our project we aim to investigate how this pattern of private and public land management influences vegetation recovery through normalized differenced vegetation index analysis (NDVI) over time pre and post-fire.
- How quickly does vegetation recover after wildfires?
- How does recovery vary based on land management practices? .



Methodology: Datasets

- Landsat 7-8 imagery 2012-2022 (Google Earth Engine): 30% cloud cover. 92 images
- Douglas Complex Fire (2013) .tif file (*Zald and Dunn 2018*)
- Land Status Oregon ownership (BLM arc services): 1 (white) = private, 0 (black) = BLM



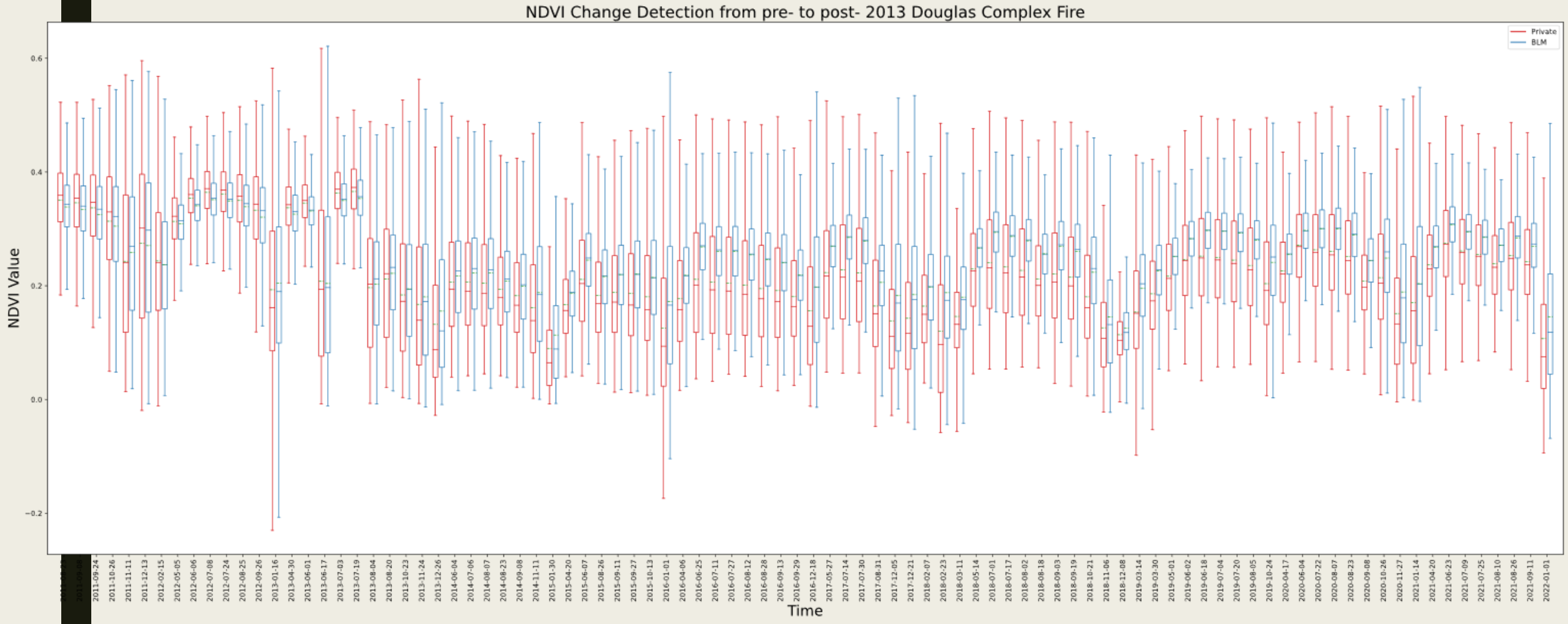
Methodology: Tools

- Google Earth Engine: Landsat images
- gdal: convert Douglas fire extent .tif and land status .tif to match crs of Landsat images (ESPG: 32610) and pad their spatial extents to match Landsat images
- Jupyter Lab: manipulation and analysis of data after downloading and using gdal from command line

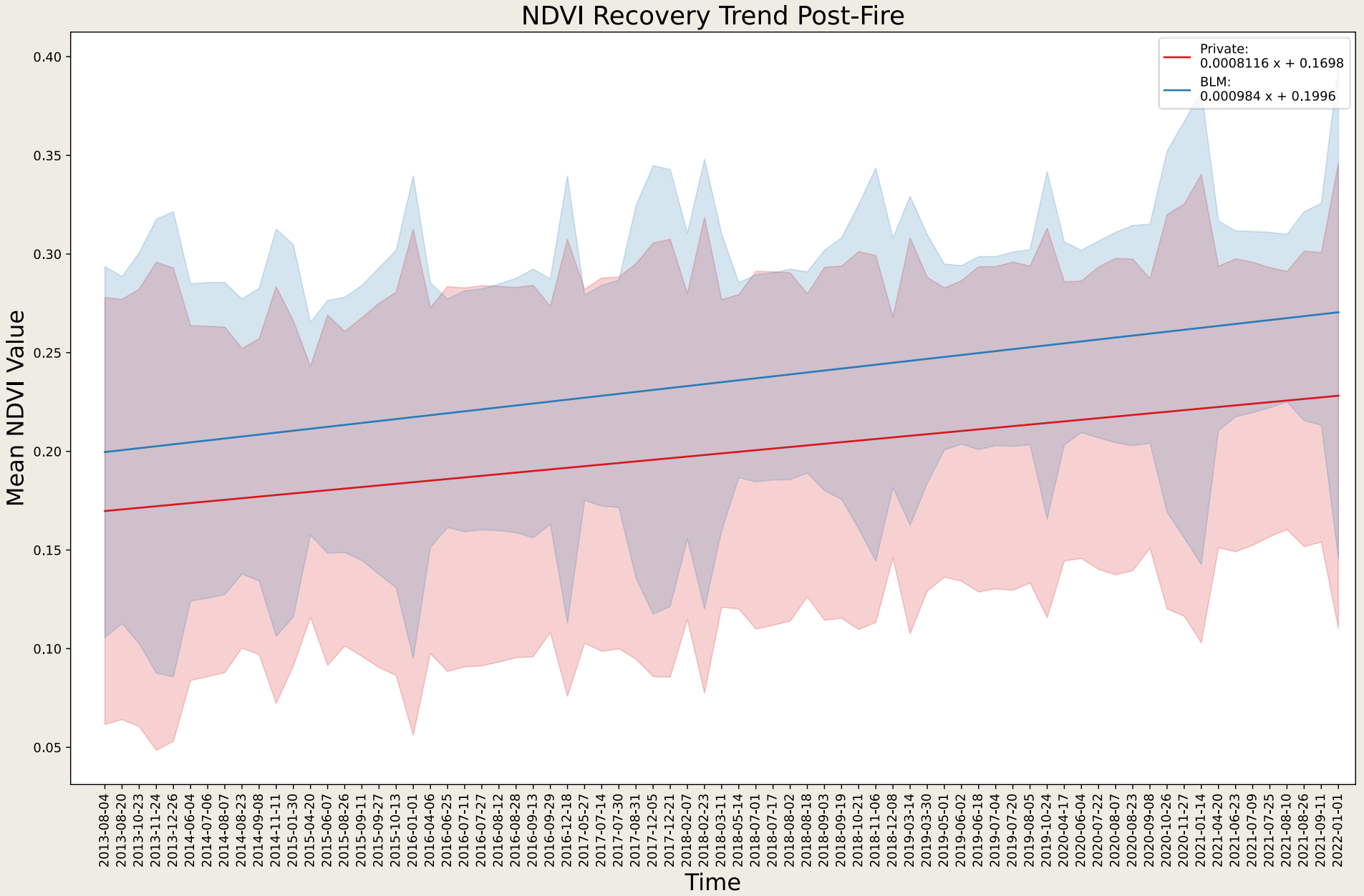
Methodology: Workflow

1. Query Landsat Collection through Google Earth Engine via Google Collab.
2. Calculate Normalized Difference Vegetation Index (NDVI) of each image.
3. Convert Douglas Fire extent and ownership tifs to ESPG: 32610.
4. Pad Douglas Fire and ownership tifs to match Landsat spatial extent.
5. Subset and clip NDVI images based on Douglas Fire extent .tif file.
6. Subset newly clipped NDVI images based on a binary ownership file.
7. Analyze trends in the resulting data with boxplot and mean values.

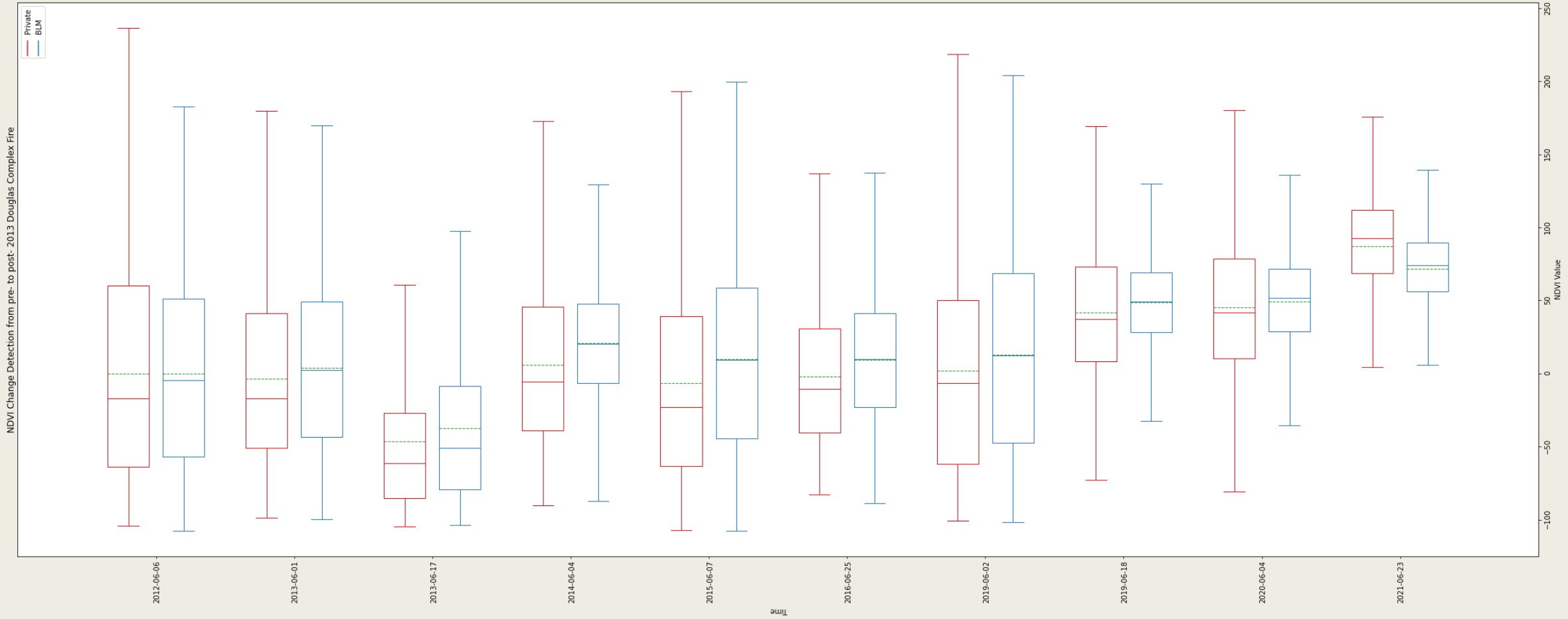
Results: Boxplots



Results: Post-fire Mean NDVI Trendlines

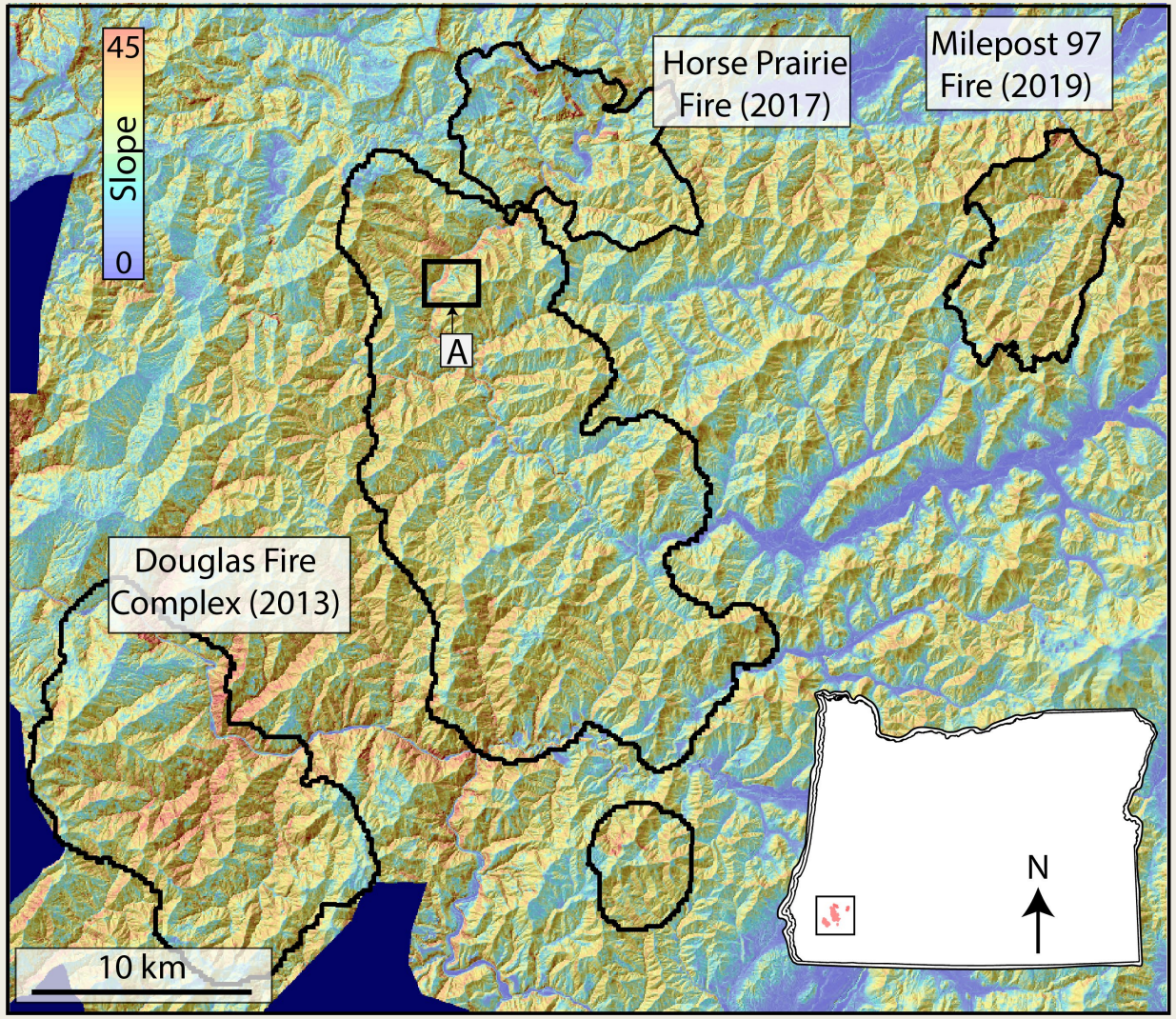


Results: June “Percent Recovery”



Further Steps & Questions

- Apply to more fires (there are plenty in the area)
- Separate land management further than just private and BLM. Or connect to “time since salvage logging”
- Account for serial correlation (seasonality)
- Connect to Brooke’s LiDAR change detection project



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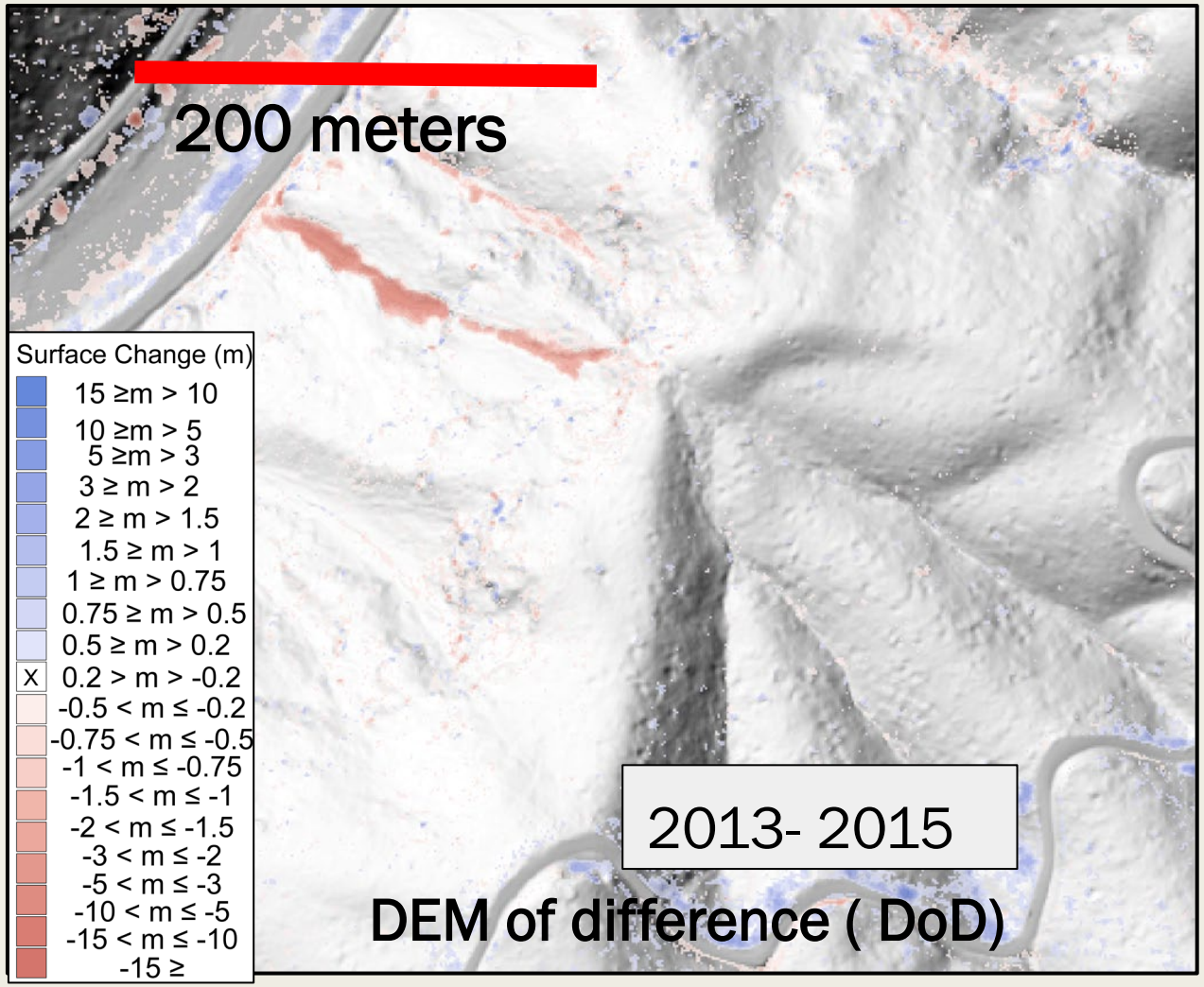

References and Links

- https://github.com/bhunter2/PostFire_NDVI