

# Evaluating Grassland Conversion and the Related Likelihood of Fire Disturbance to Enhance Fire Monitoring and Management in the Kenai Peninsula, Alaska



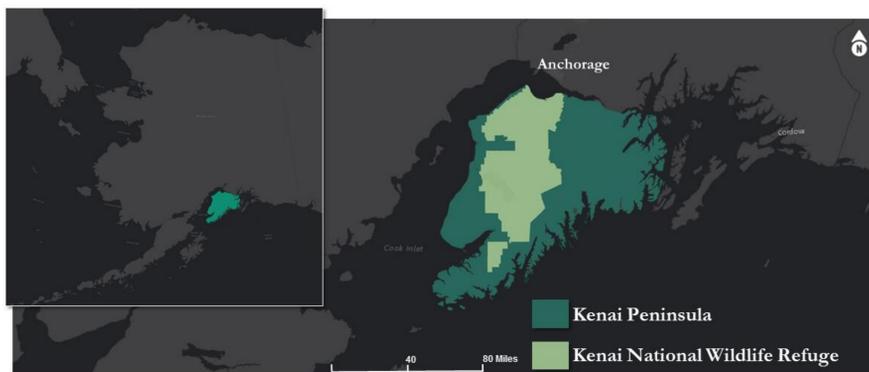
## Abstract

Spruce beetle-induced (*Dendroctonus rufipennis* (Kirby)) mortality on the Kenai Peninsula has heightened local wildfire risk as canopy loss facilitates the conversion from forest to fire-prone grassland. We collected images from NASA Earth observations to visualize land cover succession at roughly five-year intervals following a severe, mid-1990's beetle infestation to the present. Using ArcGIS Pro, we classified these data by vegetation cover type to quantify grassland encroachment patterns over time. We used the raster calculator in ArcGIS Pro to conduct a change detection analysis on the land cover classifications. The resulting change image will give the Kenai National Wildlife Refuge (KENWR) ecologists a better understanding of where forests have converted to grassland since the 1990s. These classifications provided a foundation for us to integrate digital elevation models (DEMs) and geospatial temperature and precipitation data into a model using R for assessing and mapping changes in wildfire risk. Spatial representations of this risk will contribute to a better understanding of ecological trajectories of beetle-affected landscapes, thereby informing management decisions at KENWR.

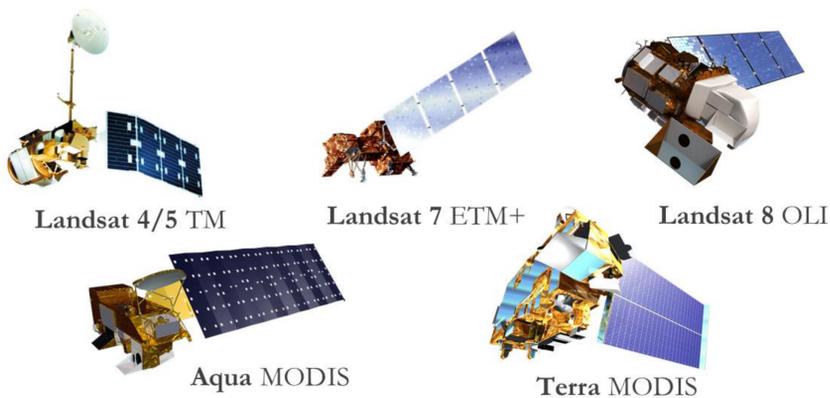
## Objectives

- ▶ **Develop** a land cover classification system for locating areas of grassland conversion
- ▶ **Detect** and quantify land cover change stemming from fire and beetle disturbances from 1989 to the present
- ▶ **Map** and assess emergent wildfire risk due to this conversion across the peninsula

## Study Area



## Earth Observations



## Team Members



## Acknowledgements

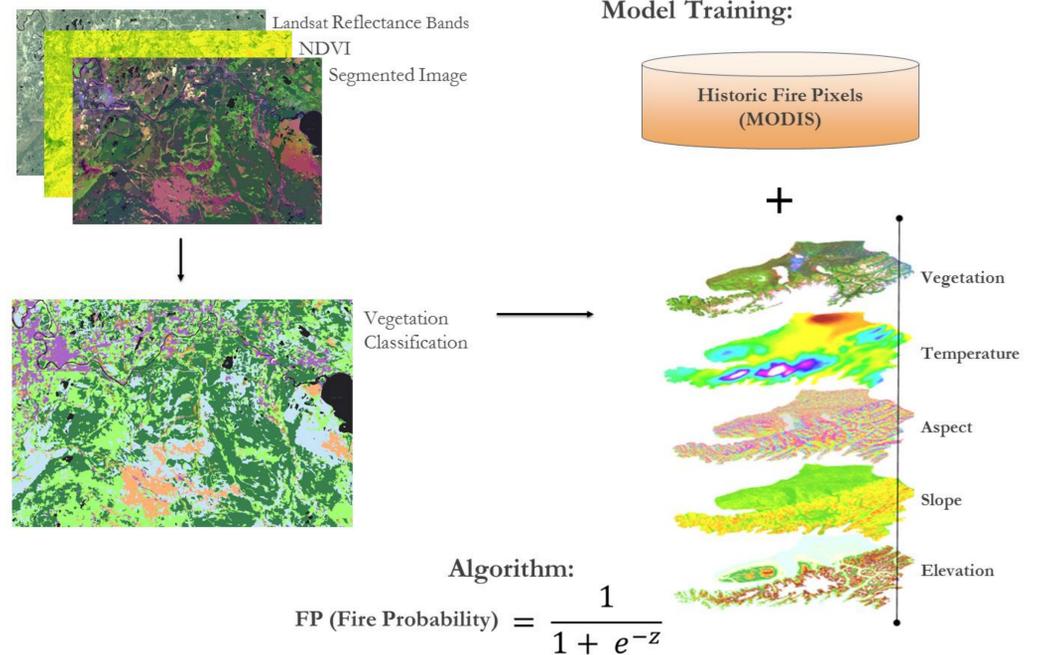
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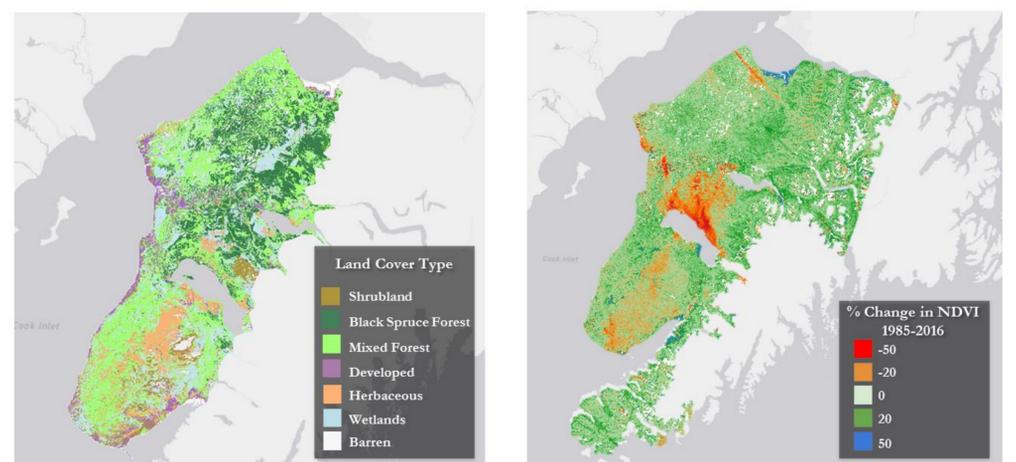
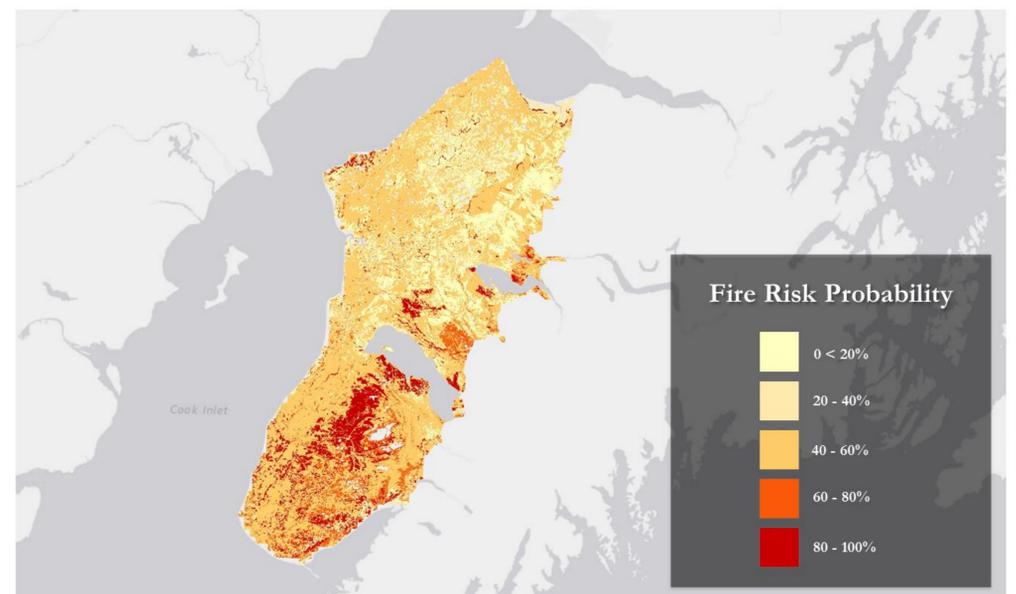
US Fish & Wildlife Service, Kenai National Wildlife Refuge



## Methodology



## Results



## Conclusions

- ▶ Conversion of spruce forest to grassland increases the prevalence of changing fire regimes in the KENWR.
- ▶ Spruce forests in the Caribou Hills that were severely damaged by spruce beetles exhibit significantly higher fire risks in our model, therefore we predict similar outcomes across comparable landscapes.

