Modeling and Analysis of Wildfire Behavior in New England Using FARSITE

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Research Question, Project Aim, and Introduction

How do variations in fuel load and climate conditions affect wildfire intensity across New England?

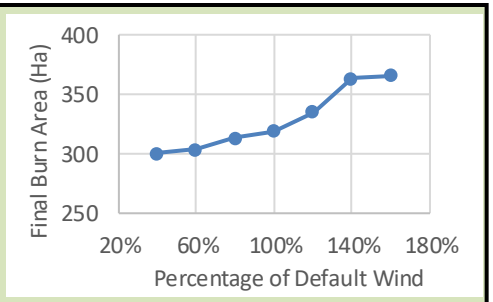
This project will build a wildfire-prediction framework for the eastern United States by using geospatial data and tools like FlamMap and FARSITE.

Wildfire risk is increasing in the eastern United States, yet most fire models are designed for western ecosystems. Eastern forests differ in fuels, climate, and exhibit a pronounced spring wildfire season, requiring region-specific analysis. Growing fuel loads combined with periods of heat, dryness, and drought can create conditions for high-intensity fires even in Massachusetts.

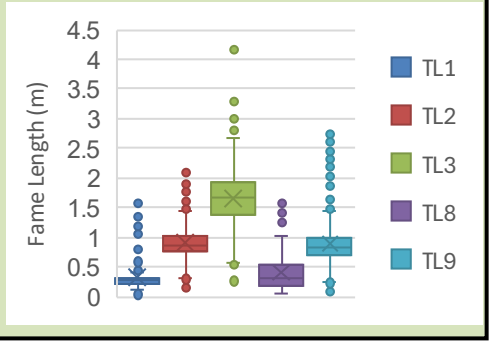
FARSITE captures general wildfire spread in New England but underpredicts severity, highlighting the need for region-specific fuel models and accurate wind data.

Data Analysis and Results

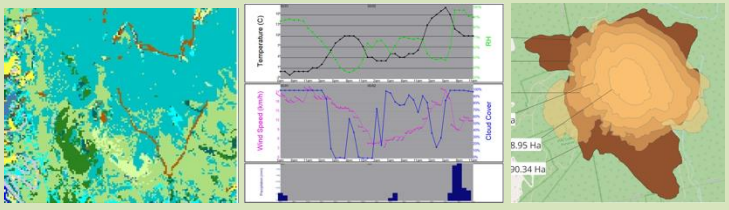
Final burn area produced under different wind-speed multipliers (40–160% of default conditions).

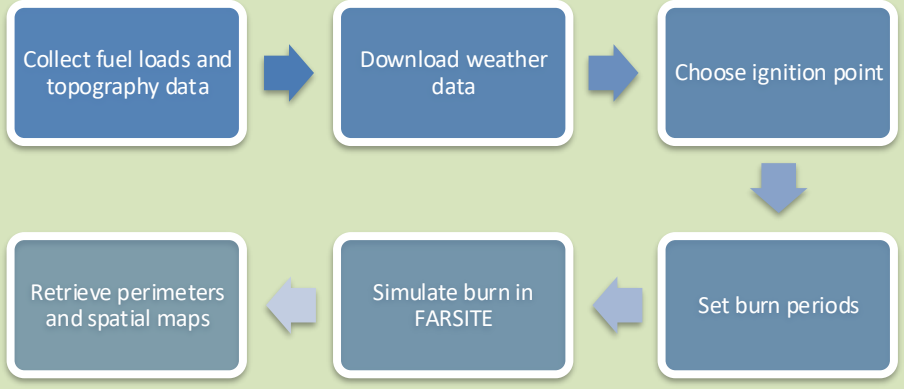


Simulated flame length distributions for five LANDFIRE surface fuel models.



Methodology





Conclusion and Implications

- FARSITE captured general fire spread patterns but underestimated total burn area.
- Results highlight the need for New England–specific fuel models.
- Predicted burn size was highly sensitive to wind speed.
- April simulations showed the greatest spread, aligning with the spring fire season.
- Improved regional inputs and validation data would enhance prediction accuracy.