The Normal Fire Environment

Modeling Large Wildfire Suitability using Past, Present, and Future Climate Normals

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Presentation Outline

• Describe process for modeling the probability of large wildfires in Oregon and Washington

• Explain how the baseline models were projected through 2100 using downscaled climate data

• Display preliminary results in graphical and mapped format
The role of models in this context is to help

- Identify plausible future conditions,
- highlight regional vulnerability to large wildfire
- provide insight into the range and variability of potential climate change effects.
- examine general ecological principles rather than predict the behavior of a specific ecosystem or ownership.
- inform strategic decision making processes and policy development.
Spatial Distribution Modeling

Occurrence data *aka* the Response Variable

Environmental data *aka* Predictor Variables  
*GIS layers*

Statistical Model

- Estimate relative probability of occurrence across a landscape
- *Test data*
- *Estimate relative probability of occurrence across a landscape*
- *...and future landscapes*

Model evaluation

*Test data*
Spatial Distribution Modeling

Fire Perimeters as Response Variable

- Fire Perimeters 1971 to 2000
  subsampled: \((\text{area burned} / \text{smallest perimeter})^{0.5}\)
- Forested Area
**Temperature and Precipitation**

- Max temperature (Jul – Aug): 38.9%
- Precipitation (May – Sep): 22.2%

**Slope and Elevation**

- Slope (percent): 10.7%
- Elevation (m): 28.2%

**The Fire Environment Model**

- Forested areas

**Forested areas**
Map Validation and Classification


Independent Test (2001-2015)
Composition of GHG emissions

Sources of GHG emissions

Latest CO₂ reading
December 09, 2014
398.48 ppm

Carbon dioxide concentration at Mauna Loa Observatory
Average Global Temperature Change
Large Forest Wildfires
Pacific Northwest Region (Oregon and Washington)
Trend in numbers of large forest wildfire and total area burned (1970-2015)
Representative Concentration Pathway
GHG Emissions Scenarios

**RCP 2.6**  Peak and decline

**RCP 4.5**  Stabilization

**RCP 6**  Stabilization

**RCP 8.5**  High Emissions
Change in Forest Area Exposed to Each Suitability Category Through 2100

Class
- High
- Moderate
- Low

Percent of Forest Area

Year
- 2000
- 2025
- 2050
- 2075
- 2100

rcp26

rcp45

rcp60

rcp85
Future Normal (2021-2050)

Large wildfire suitability classes:
- Low
- Mod
- High
- Non-forested
Blue Mountain Ecoregion
Large Wildfire Suitability – Map Validation (2001-2015)
Blue Mountain Ecoregion
Large Wildfire Suitability – Climate Normal (1981-2010)
Blue Mountain Ecoregion
Large Wildfire Suitability – Climate Normal (1991-2020)
Blue Mountain Ecoregion
Large Wildfire Suitability – Climate Normal (2041-2070)
Blue Mountain Ecoregion
Large Wildfire Suitability – Climate Normal (2051-2080)
Blue Mountain Ecoregion
Large Wildfire Suitability – Climate Normal (2061-2090)