# Wildland Fire in Southern Oregon:
## *Risk to Established Settlement*

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## Research Question

- Which established settlements in Southwestern Oregon face the greatest difficulty in suppressing wildland fire?

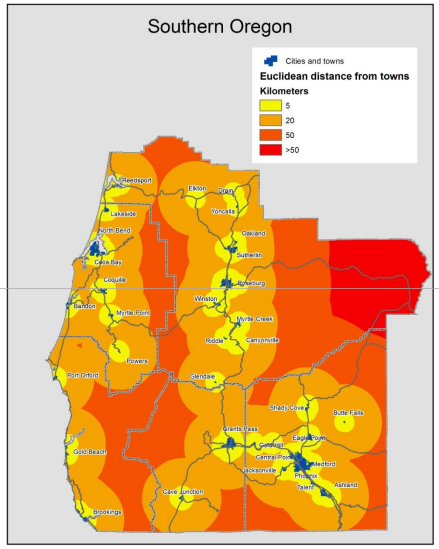

# DATA

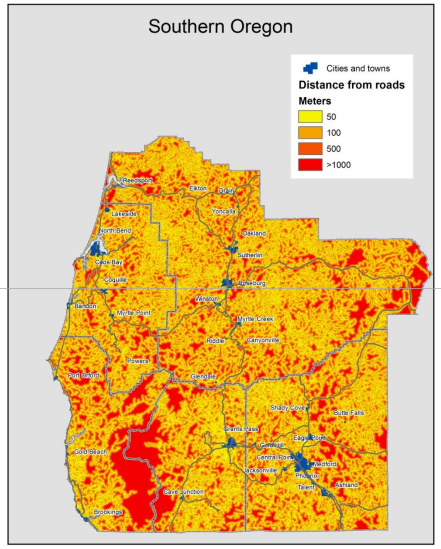
- 10 Meter DEM
  - *Slope*
- Fire Behavior fuel model
- CONUS/MODIS Fire Detection
- Land-use/Zoning Layer
- Roads
- Census Block data
  - *Dasymetric Population Distribution*

# Approach

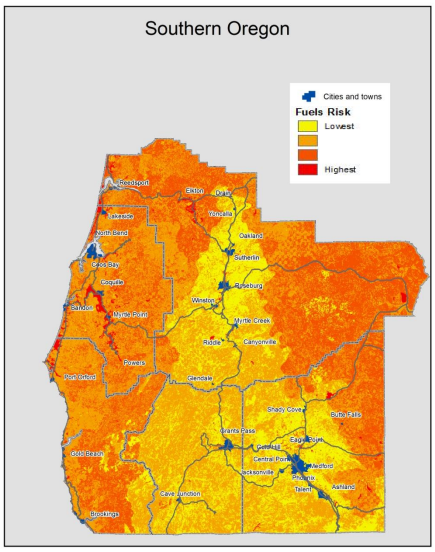


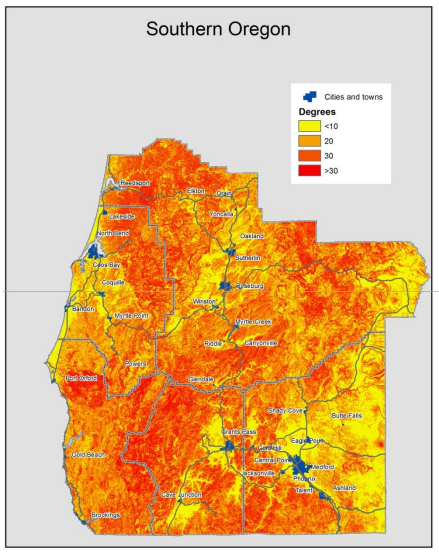

# Reclassifying the Data



# Reclassifying the Data




# Fuel Model Values for Estimating Fire Behavior

- **13 Fuel Models 4 Classifications**:
  - Grasslands
  - Shrublands
  - Timber
  - Slash

| Fuel model | Typical fuel complex |
|---|---|
| | **Grass and grass-dominated** |
| 1 | Short grass (1 foot) |
| 2 | Timber (grass and understory) |
| 3 | Tall grass (2.5 feet) |
| | **Chaparral and shrub fields** |
| 4 | Chaparral (6 feet) |
| 5 | Brush (2 feet) |
| 6 | Dormant brush, hardwood slash |
| 7 | Southern rough |
| | **Timber litter** |
| 8 | Closed timber litter |
| 9 | Hardwood litter |
| 10 | Timber (litter and understory) |
| | **Slash** |
| 11 | Light logging slash |
| 12 | Medium logging slash |
| 13 | Heavy logging slash |

**Fire Behavior based on:**
- Fuel Load
- Distribution

*among fuel particle size classes

**Fuel Models Reclassed into 8 Classes:**

*Factors for Reclassification*
- Rate of spread
- Flame Length

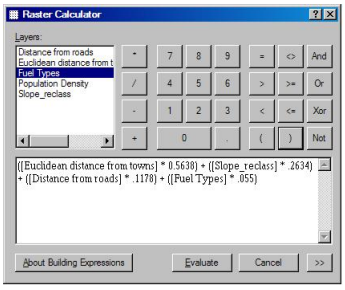
*Conditions based on wind speed of 5 mph, fuel moisture content of 8%, and live fuel moisture content at 100%

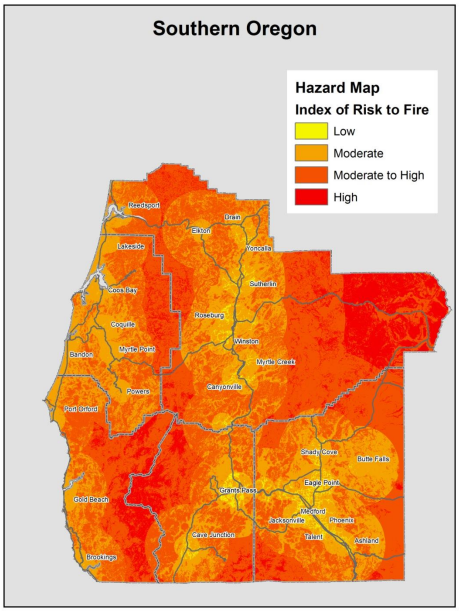
# Analytical Hierarchy Process

| | Distance From Settlement | Slope | Distance to Roads | Fuels |
|---|---|---|---|---|
| Distance from Settlement | 1 | 3 | 5 | 7 |
| Slope | 1/3 | 1 | 3 | 5 |
| Distance to Roads | 1/5 | 1/3 | 1 | 3 |

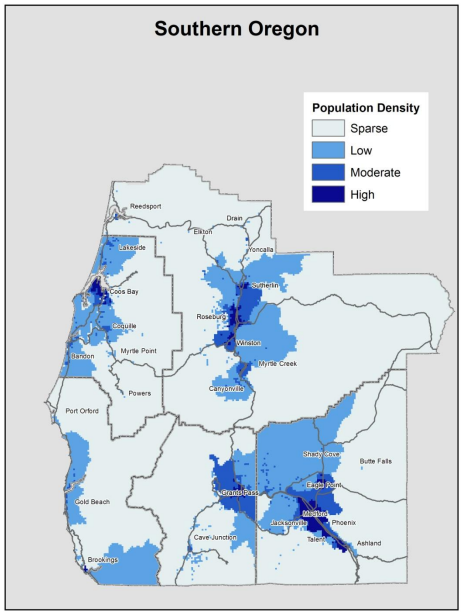
*Based on literature review and adjusted for our purposes

| Criterion | Geometric Mean | Weight |
|---|---|---|
| ***Distance from Settlement*** | $(1*3*5*7)^{1/4}$ = 3.201086 | 0.5638 |
| ***Slope*** | $((1/3)*1*3*5)^{1/4}$ = 1.495349 | 0.2634 |
| ***Distance to Roads*** | $((1/5)*(1/3)*1*3)^{1/4}$ = .66874 | 0.1178 |
| ***Fuels*** | $((1/7)*(1/5)*1/3)*1)^{1/4}$ = .312394 | 0.0550 |
| **Sum** | **5.677569** | **1.0000** |

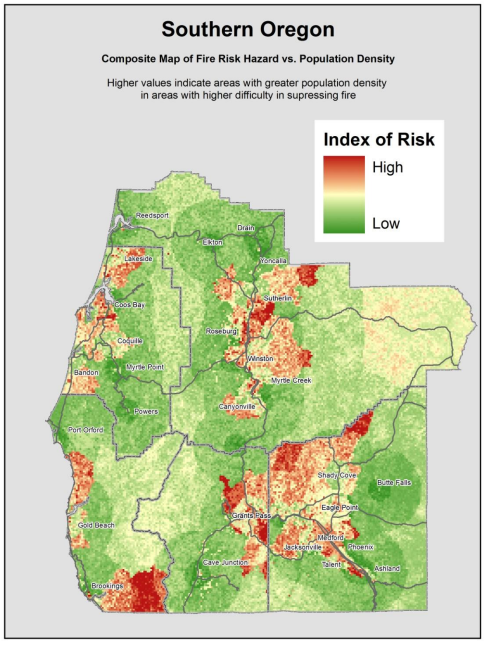


## Dasymetric Population Density




## Results



# Limitations

- Complex nature of fire behavior
- Subjectivity of analysis parameters
  - *(Expert knowledge and more data needed)*
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# References


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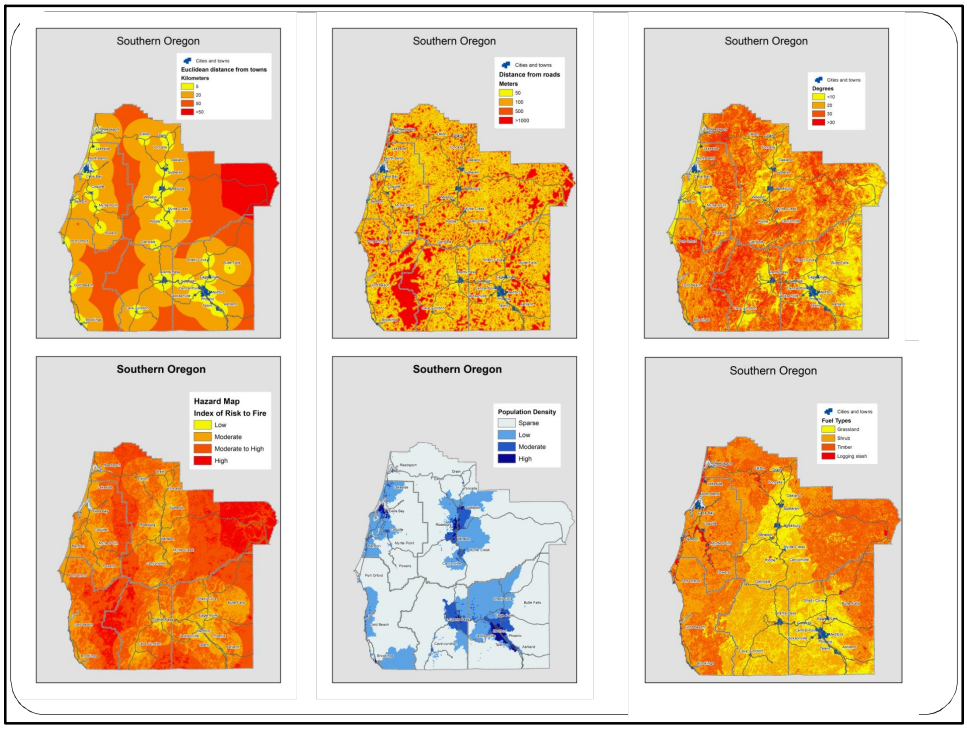
# Questions?


Southern Oregon
Euclidean distance from towns
Kilometers
Southern Oregon
Distance from roads
Meters
Southern Oregon
Degrees
Southern Oregon
Hazard Map
Index of Risk to Fire
Low
Moderate
Moderate to High
High
Southern Oregon
Population Density
Sparse
Low
Moderate
High
Southern Oregon
Fuel Types