Evaluation of LANDFIRE National Data at the Local Level

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Overview of LANDFIRE National Data

- **Fuel Data**
  - **Fuel Model**, Canopy Cover, Canopy Height, Canopy Bulk Density, Canopy Base Height, Slope, Aspect, and Elevation

- **Fire Regime Data**
  - FRCC, FRCC Departure Index, Fire Regime Groups, Mean Fire Return Interval, Percent Low-severity Fire, Percent Mixed-severity Fire, Percent Replacement-severity Fire, and **Succession Classes**

- **Existing Vegetation Data**
  - Environ. Site Potential, **Biophysical Settings**, Existing Veg Type, Existing Veg Height, Existing Veg Cover, and Vegetation Dynamics Models

- **Fire Effects Data**
  - Fuel Loading Models, and Fuel Characteristics

LANDFIRE
Fire Regime Condition Class

To evaluate the current conditions of lands in relation to their historic or "natural" reference condition, Fire Regime Condition Class (FRCC), was developed to describe the degree to which vegetation condition and structure, fire frequency and severity depart from natural or historical ecological reference conditions (Hann et al. 2005).
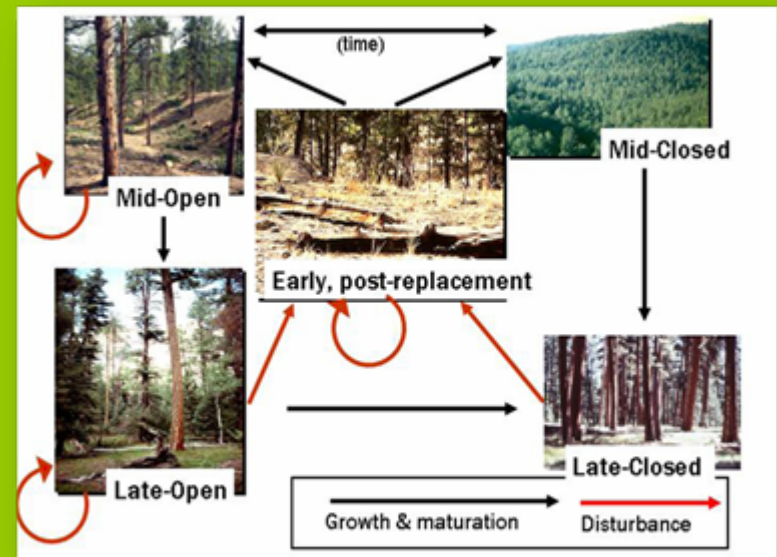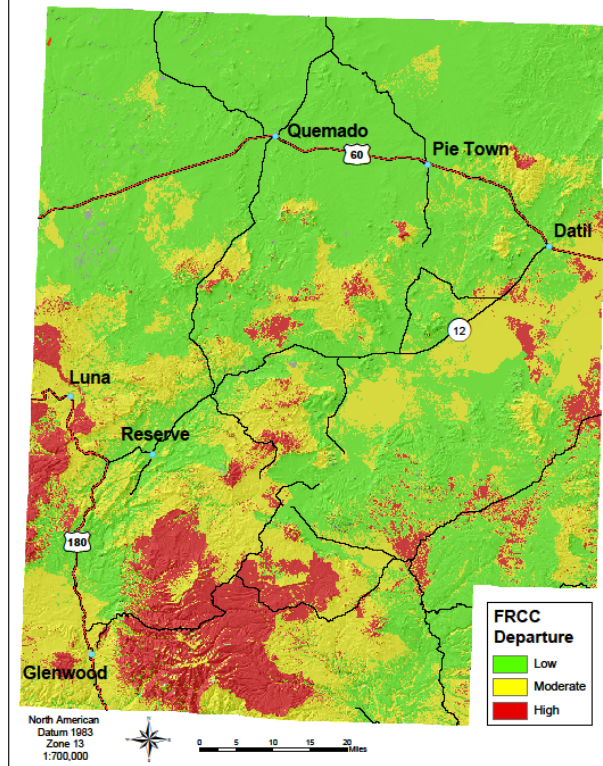
1. Current Conditions = LANDFIRE Biophysical Setting + Succession Class

2. Historic Conditions = Succession Model Class Percentages (VDDT models)

3. Similarity of Current versus Historic = FRCC

(time)

Mid-Open

Mid-Closed

Early, post-replacement

Late-Open

Late-Closed

Growth & maturation   Disturbance

Catron County FRCC

Catron County CWPP FRCC Classification

- Current Condition = ReGAP for BPS & Local Remote Sensing for Succession Class
- Historic Condition = Locally Developed Succession Models
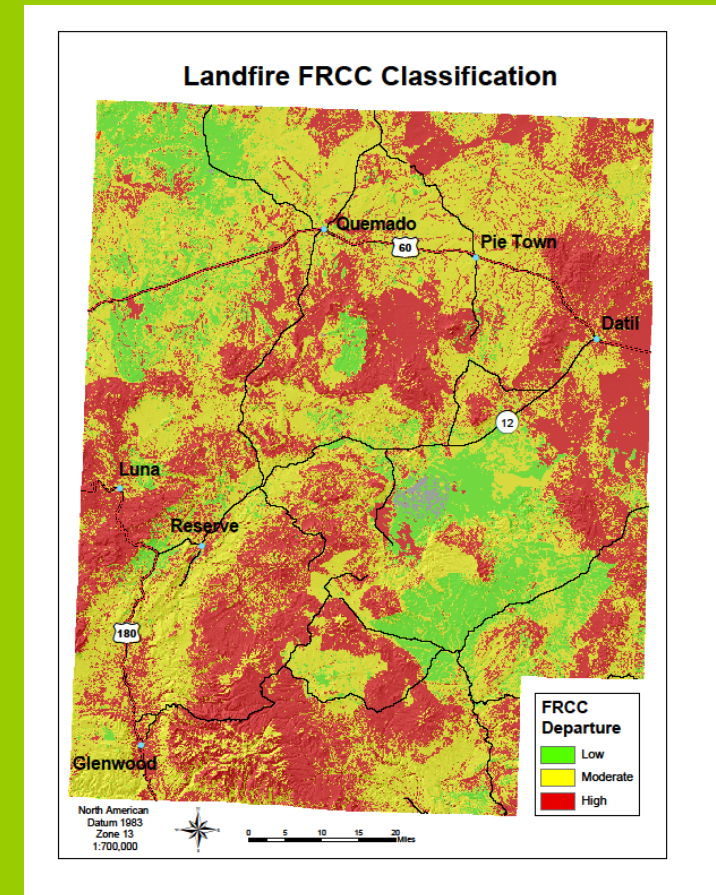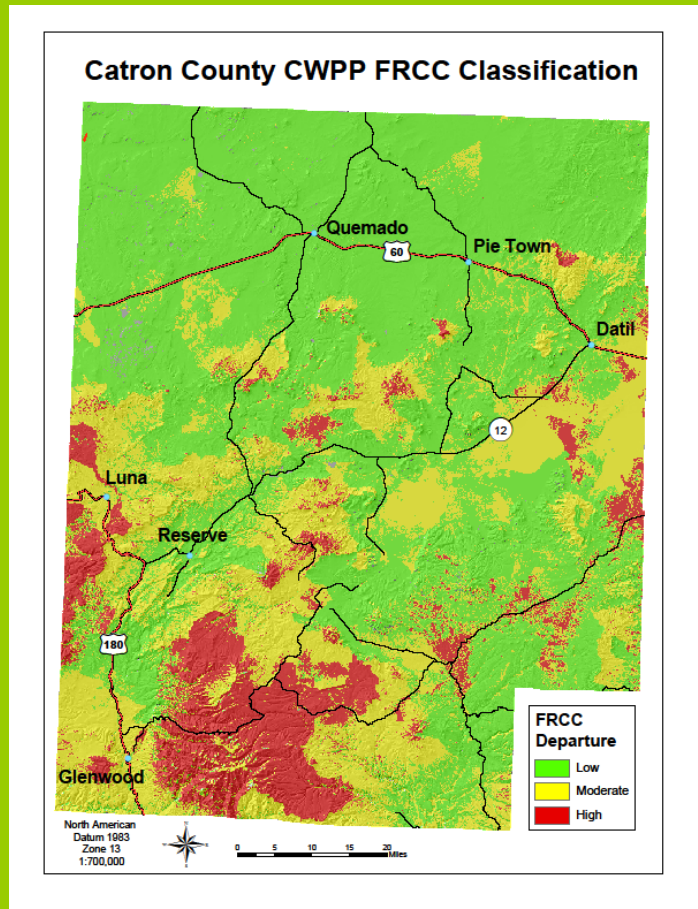- FRCC similarity metric

Catron County FRCC

LANDFIRE FRCC was higher overall than Catron County FRCC

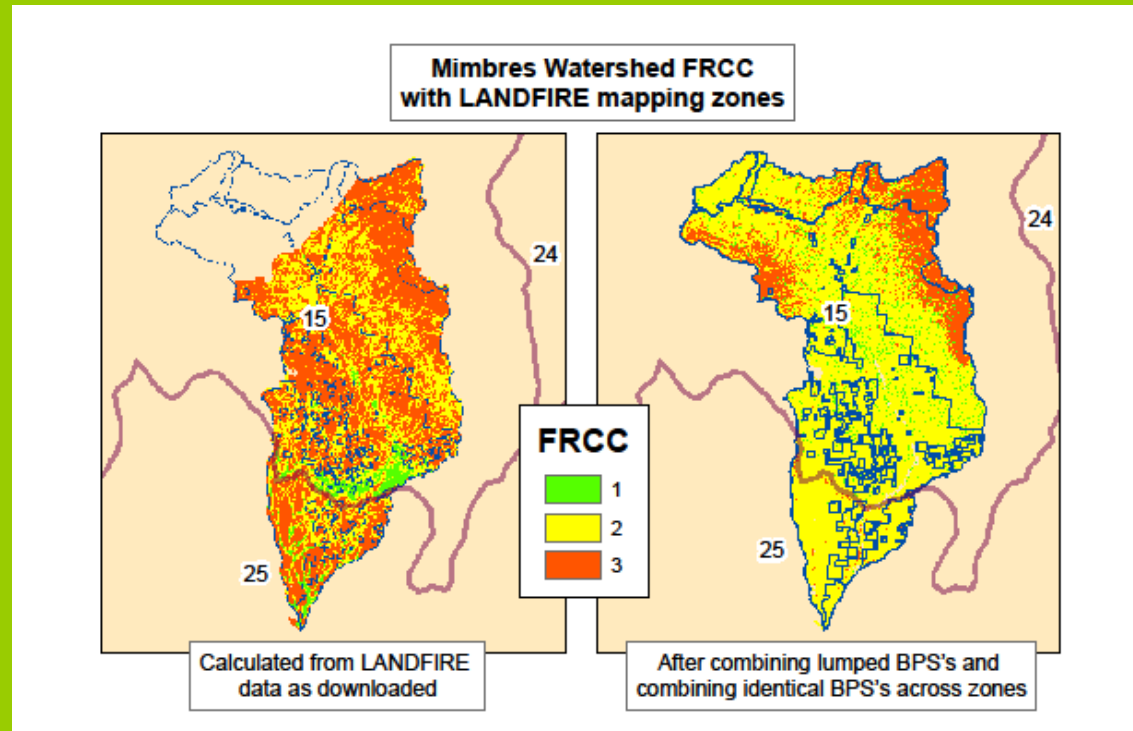Likely the result of smaller number of BPS classes identified for Catron County FRCC analysis

Catron County identified 45 BPS classes, whereas LANDFIRE identified over 200 BPS classes

Catron County CWPP FRCC Classification
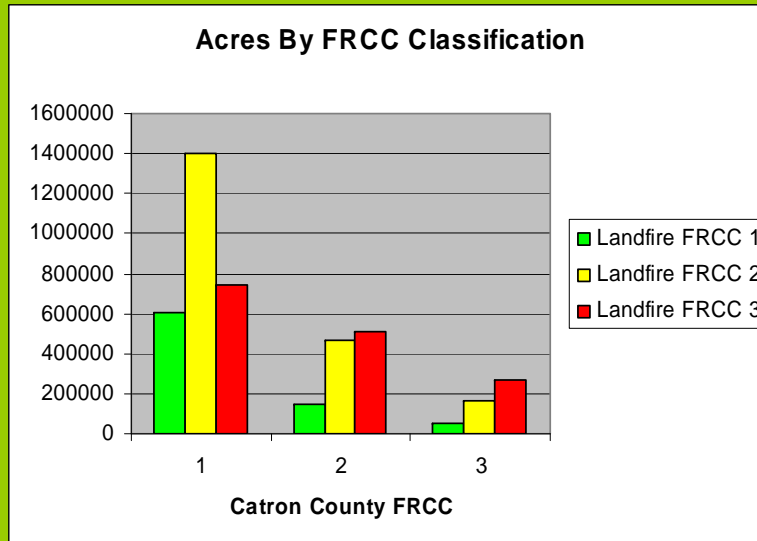

Landfire FRCC Classification

Mimbres FRCC

1. Combine BPS across zones

2. Combine lumped BPS *(eg Madrean Pine Oak & Madrean Encinal)*

3. Evaluate at landscape level

Mimbres Watershed FRCC with LANDFIRE mapping zones

FRCC
- 1 (green)
- 2 (yellow)
- 3 (orange)

Calculated from LANDFIRE data as downloaded

After combining lumped BPS's and combining identical BPS's across zones

Catron County FRCC

Acres By FRCC Classification

- Green = Similar LANDFIRE and Catron County FRCC classification

- Red = Dissimilar LANDFIRE and Catron County FRCC classification

Landfire FRCC / Catron County FRCC Comparison
Gropuped By Relative Departure
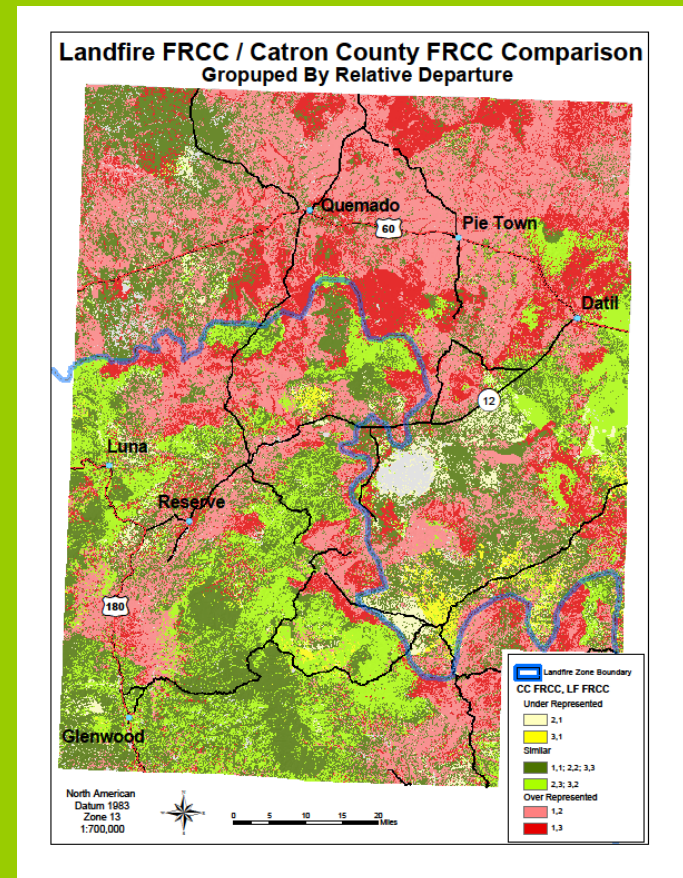
Catron County FRCC

80.2% of SW ReGAP PJ was classified as a non PJ BPS by LANDFIRE

• Southern Rocky Mountain Ponderosa Pine Woodland or Savanna
• Inter-Mountain Basins Semi-Desert Shrub-Steppe
• Inter-Mountain Basins Semi-Desert Shrub-Steppe
• Inter-Mountain Basins Semi-Desert Shrub-Steppe
• Inter-Mountain Basins Mixed Salt Desert Scrub
• Southern Rocky Mountain Ponderosa Pine Savanna

Pinyon-Juniper And Ponderosa Pine As Classified By SW ReGAP
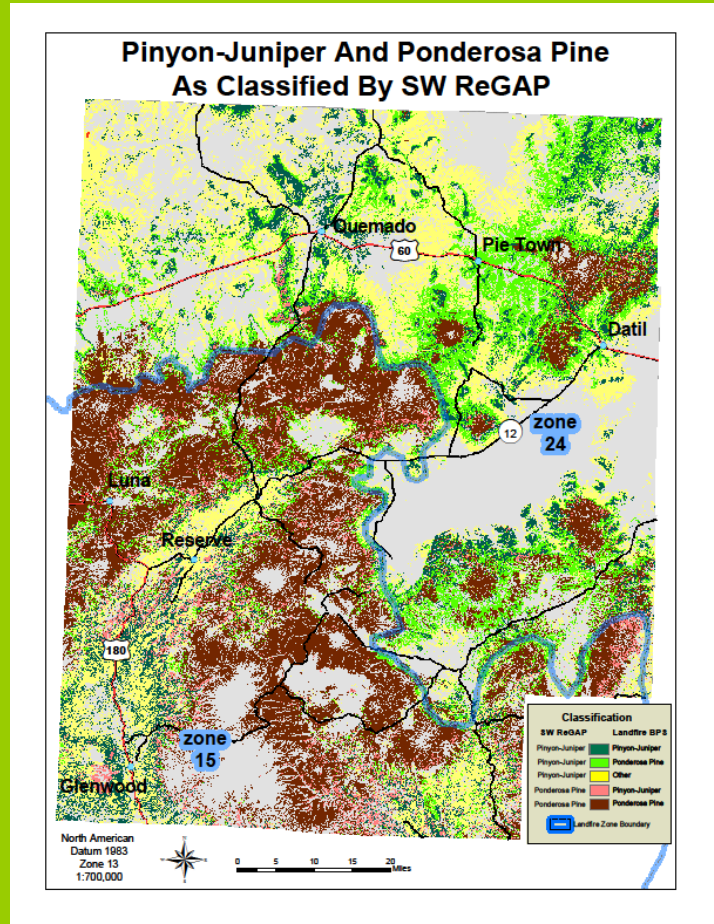
Misclassification of Pinyon-Juniper

• **Bright Green**
  – ReGAP = PJ & LANDFIRE = Ponderosa

• **Yellow**
  – ReGAP = PJ & LANDFIRE = Shrub/Scrub BPS

FRCC Recommendations

- If lumped BpS are present in the same zone, and use same reference conditions, model as one BpS.

- If a BpS is present in both zones and uses the same reference condition, model as one BpS.

- If a BpS is present in both zones, but has different reference conditions, model as one BpS using the reference condition of the zone with the most acres of the BpS.

- Compare LANDFIRE BpS & SClass data with local vegetation layer to evaluate problem areas

Fire Threat

LANDFIRE DATA

• Fuel Model

• Canopy Cover

• Canopy Height

• Canopy Bulk Density

• Canopy Base Height

• Slope

• Aspect

• Elevation

- Expert Opinion
  - Reclass of Veg Data (Catron County)

- FBAT (FlamMap) , FARSITE, & others
  - Use spatial explicit fuel inputs (LANDFIRE data) to output fire behavior
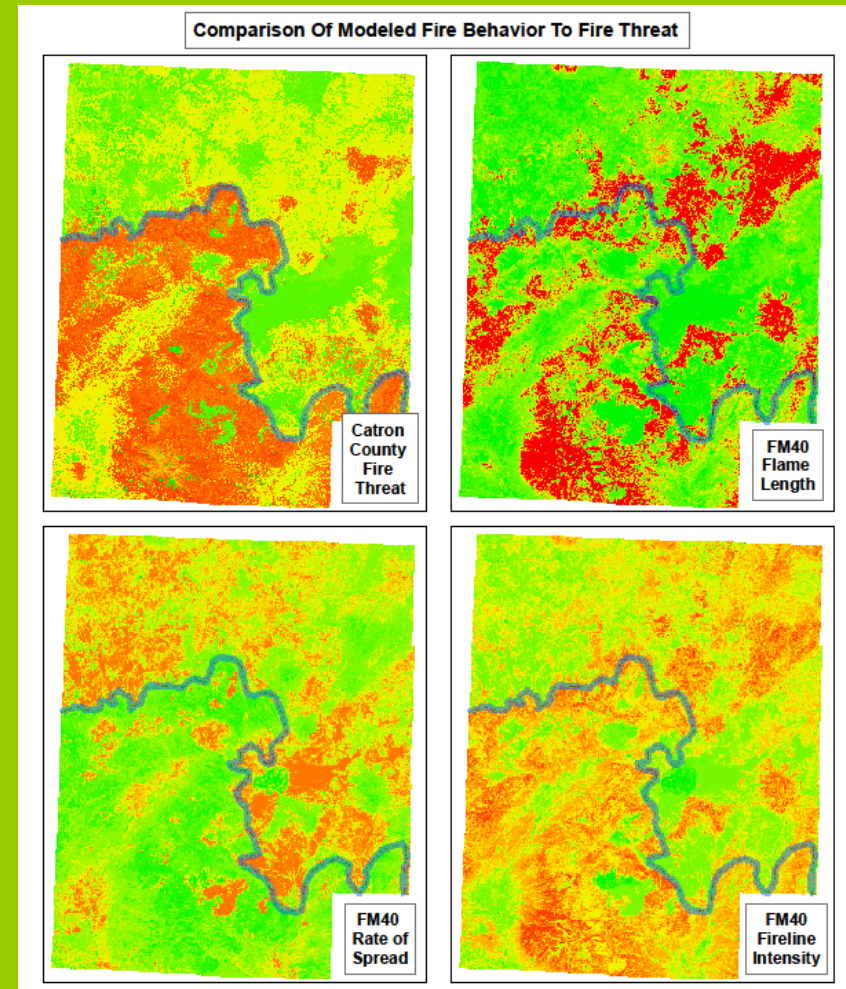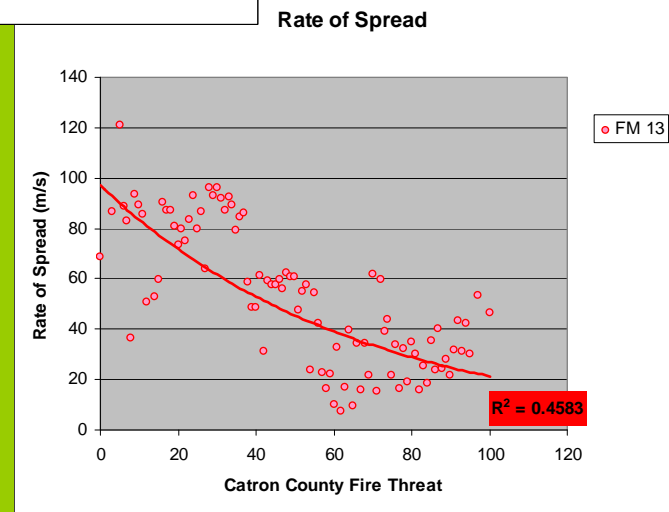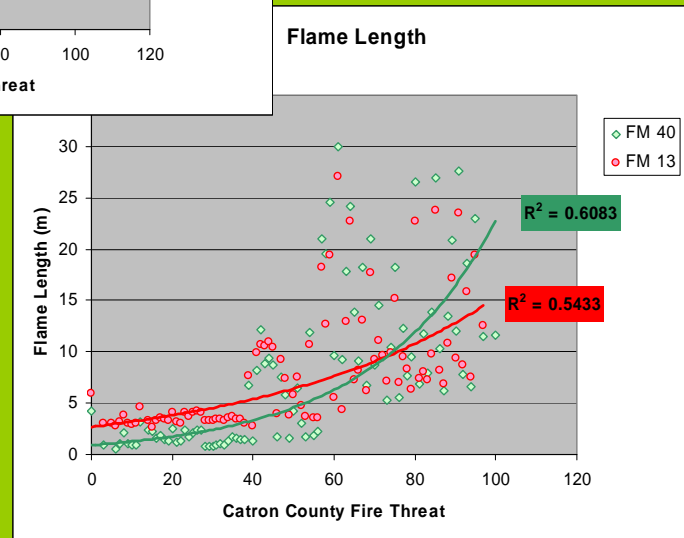 - Fire Threat represented by combination of fire behavior outputs
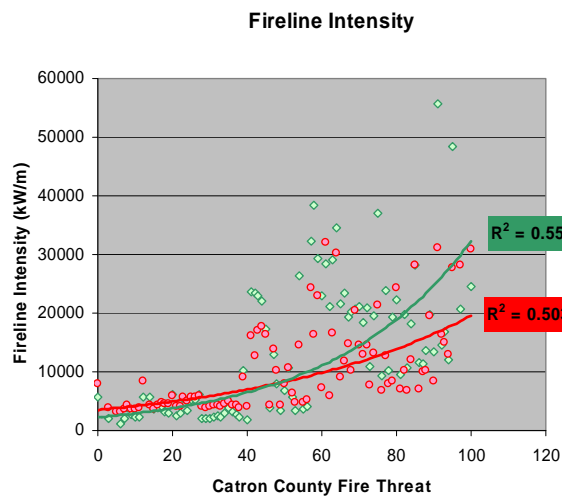
FBAT Fire Behavior Outputs vs CC Fire Threat

- Catron County Fire Threat is relative does not relate specifically to any fire behavior variable

- Clear differences occur across LANDFIRE zone boundary (FL, FLI overestimated in zone 24)

Comparison Of Modeled Fire Behavior To Fire Threat

Catron County Fire Threat

FM40 Flame Length

FM40 Rate of Spread

FM40 Fireline Intensity

FBAT Fire Behavior Outputs vs CC Fire Threat Regressions

Fireline Intensity

$R^2 = 0.5543$

$R^2 = 0.5031$

Flame Length

$R^2 = 0.6083$

$R^2 = 0.5433$
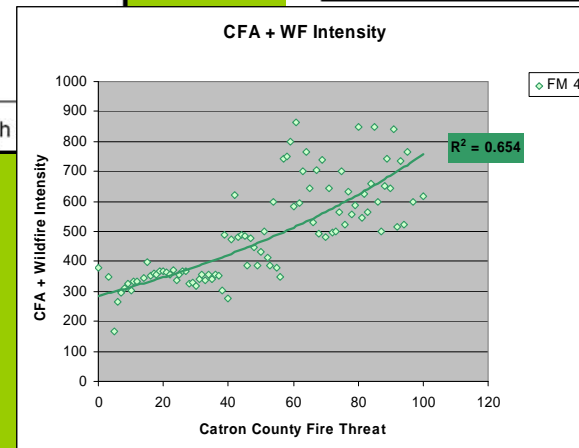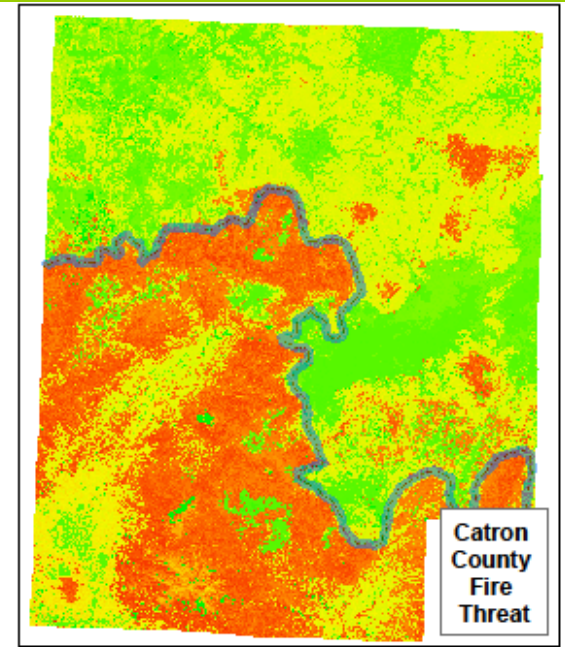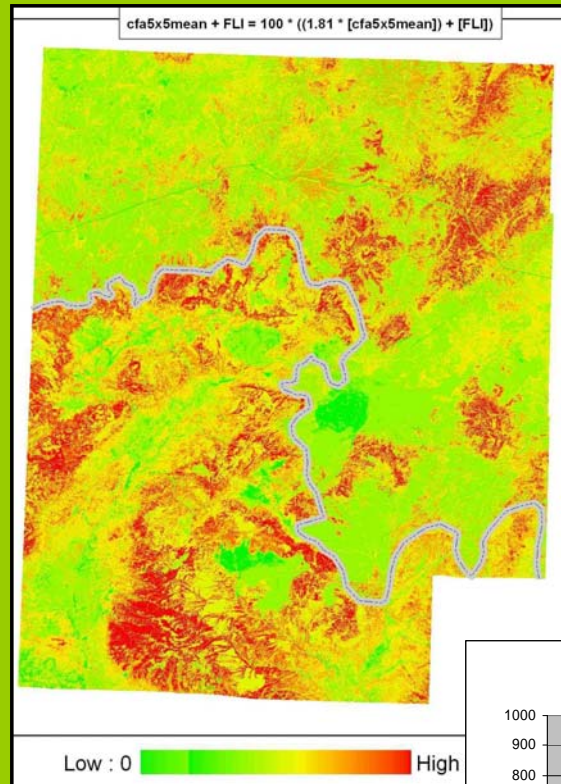
Rate of Spread

$R^2 = 0.4583$

- FM 40 better correlated than FM 13 overall
- Flame length was most closely correlated

Crown Fire Activity and Wildfire Intensity

- Adding CFA to WF Intensity improves correlation (R^2=.654)

- Fire Threat (CFA + WFI) increases threat rating in timber, decreases it in grass (more in line with CC fire threat)
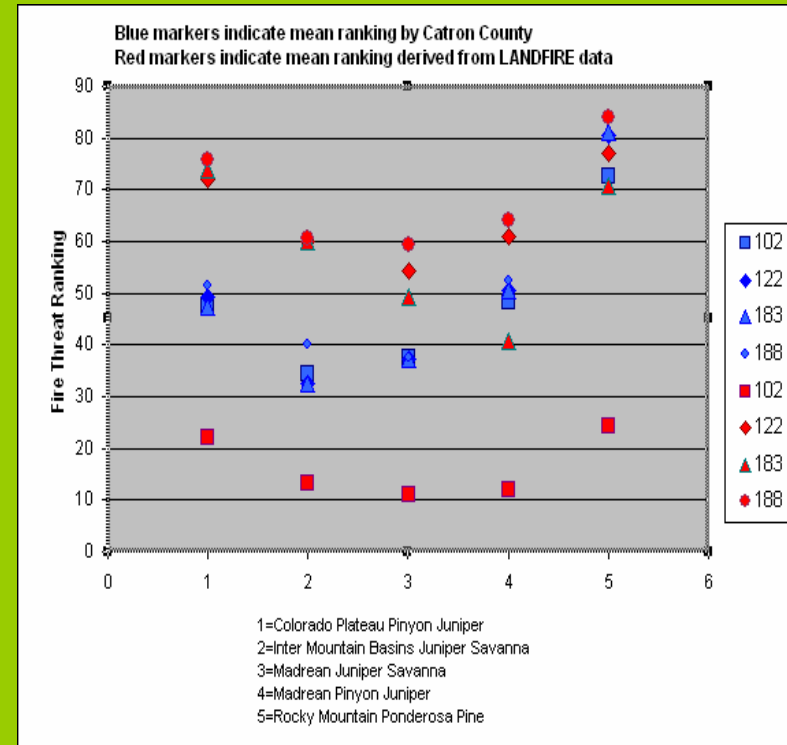

cfa5x5mean + FLI = 100 * ((1.81 * [cfa5x5mean]) + [FLI])

Low : 0   High

Catron County Fire Threat

CFA + WF Intensity

$R^2 = 0.654$

FM 40

CFA + Wildfire Intensity

Catron County Fire Threat
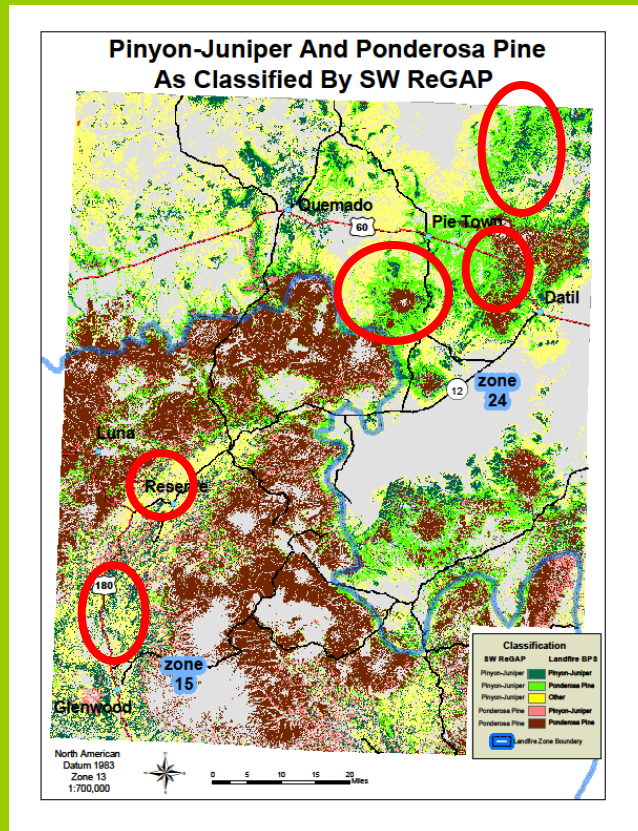
Fire Threat Analysis

Fire threat for grass fuel model (102) is lower in all ReGAP veg types

CC fire threat is an average of timber and grass fuel models for a particular veg type

- Fire threat ratings from LANDFIRE and Catron County are similar across ReGAP veg types

- LANDFIRE Fire Threat Ranking (WFI + CFA) result in greater variation of fire threat by veg type

Blue markers indicate mean ranking by Catron County
Red markers indicate mean ranking derived from LANDFIRE data

Fire Threat Ranking

Legend: 102, 122, 183, 188, 102, 122, 183, 188

1=Colorado Plateau Pinyon Juniper
2=Inter Mountain Basins Juniper Savanna
3=Madrean Juniper Savanna
4=Madrean Pinyon Juniper
5=Rocky Mountain Ponderosa Pine

Ponderosa/Pinyon-Juniper And LANDFIRE Zone Effects On Fire Threat Ratings

Pinyon-Juniper And Ponderosa Pine As Classified By SW ReGAP

CFA + FLI Residuals

CFA_FLI_residual = [CCFireThreat] – (67.007 * Ln ([CFA_FLI]) – 361.41)

Negative — Positive

- LANDFIRE ratings higher than Catron County in zone 24, lower in zone 15
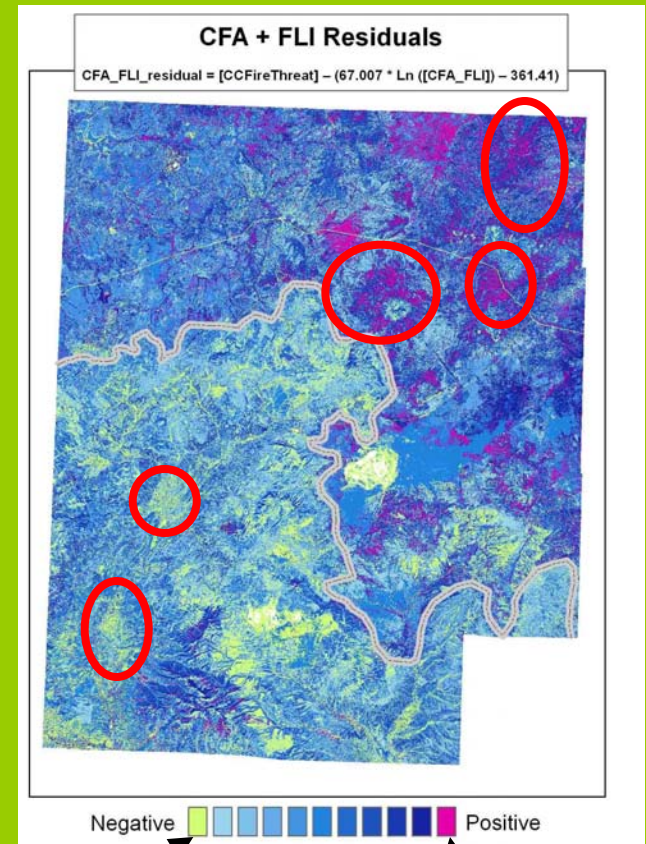
Landfire CFA+FLI < CC fire threat

Landfire CFA+FLI > CC fire threat

Fire Threat Recommendations

- LANDFIRE Data improved fire threat results.

  - Increased variation of fire threat within each vegetation type.

- LANDFIRE fire threat differs across zones.

  - Compare BPS data to local vegetation layer to identify areas where fire threat might have problems

Questions?