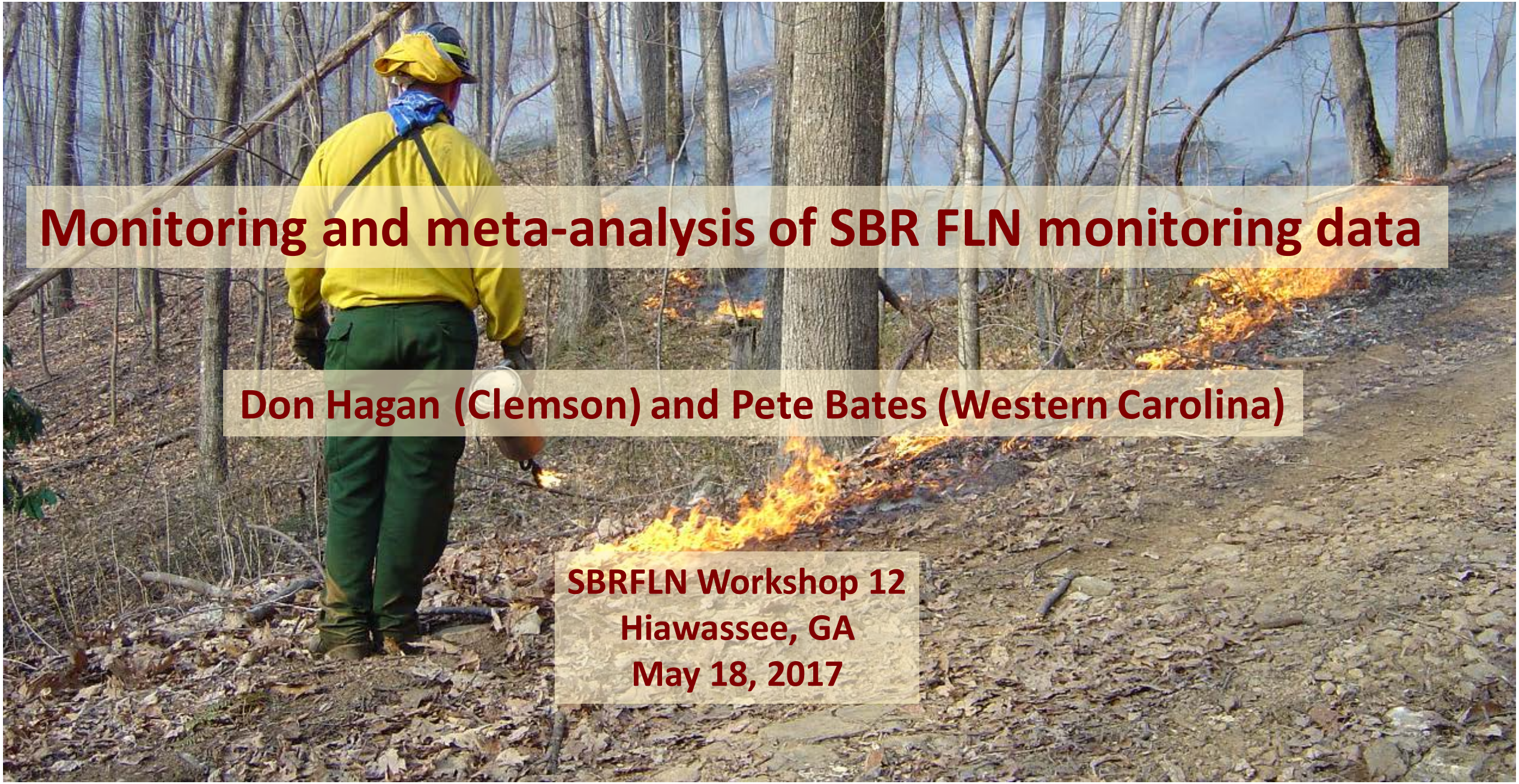
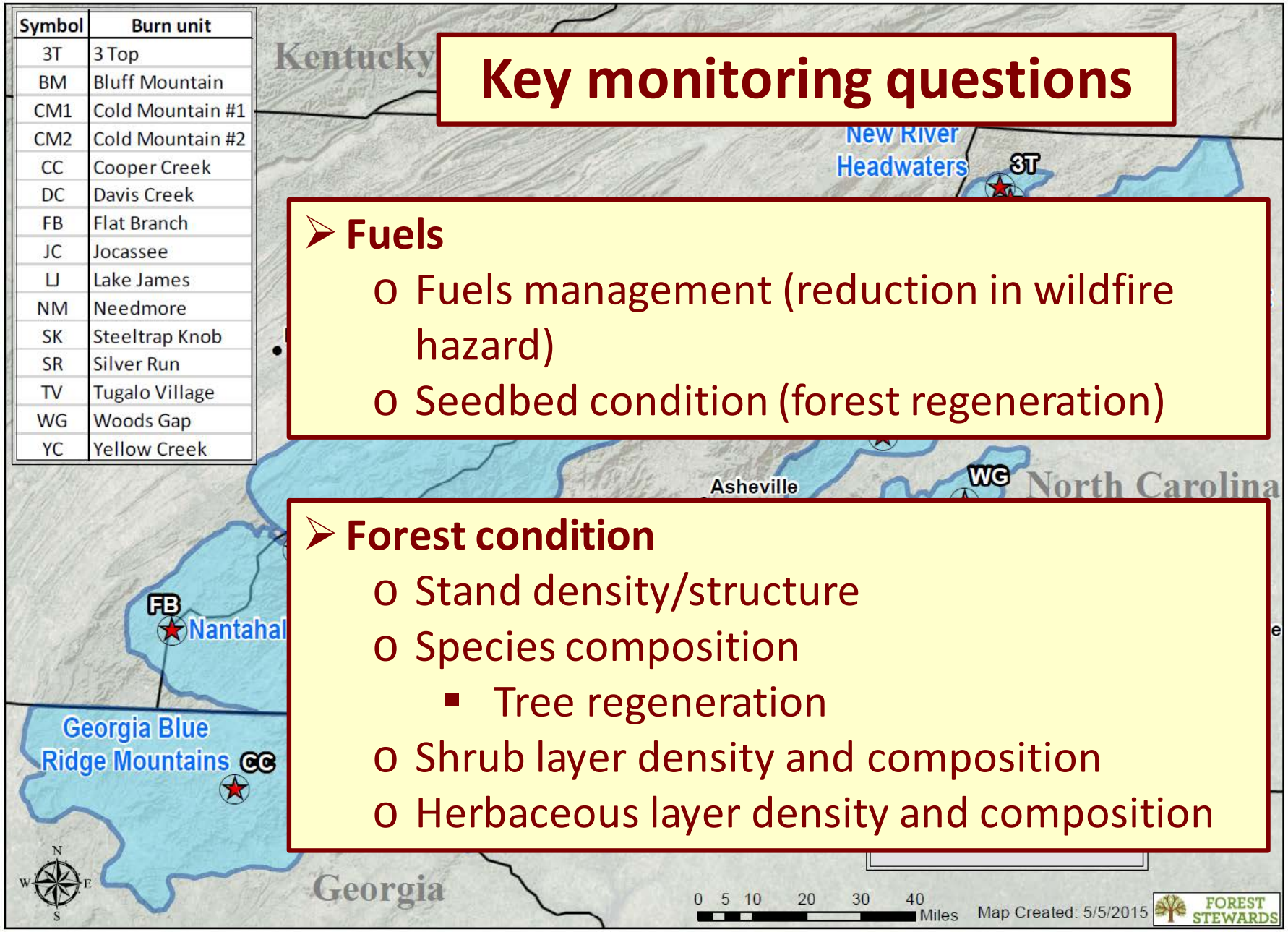


Monitoring and meta-analysis of SBR FLN monitoring data

Don Hagan (Clemson) and Pete Bates (Western Carolina)

SBRFLN Workshop 12
Hiawassee, GA
May 18, 2017

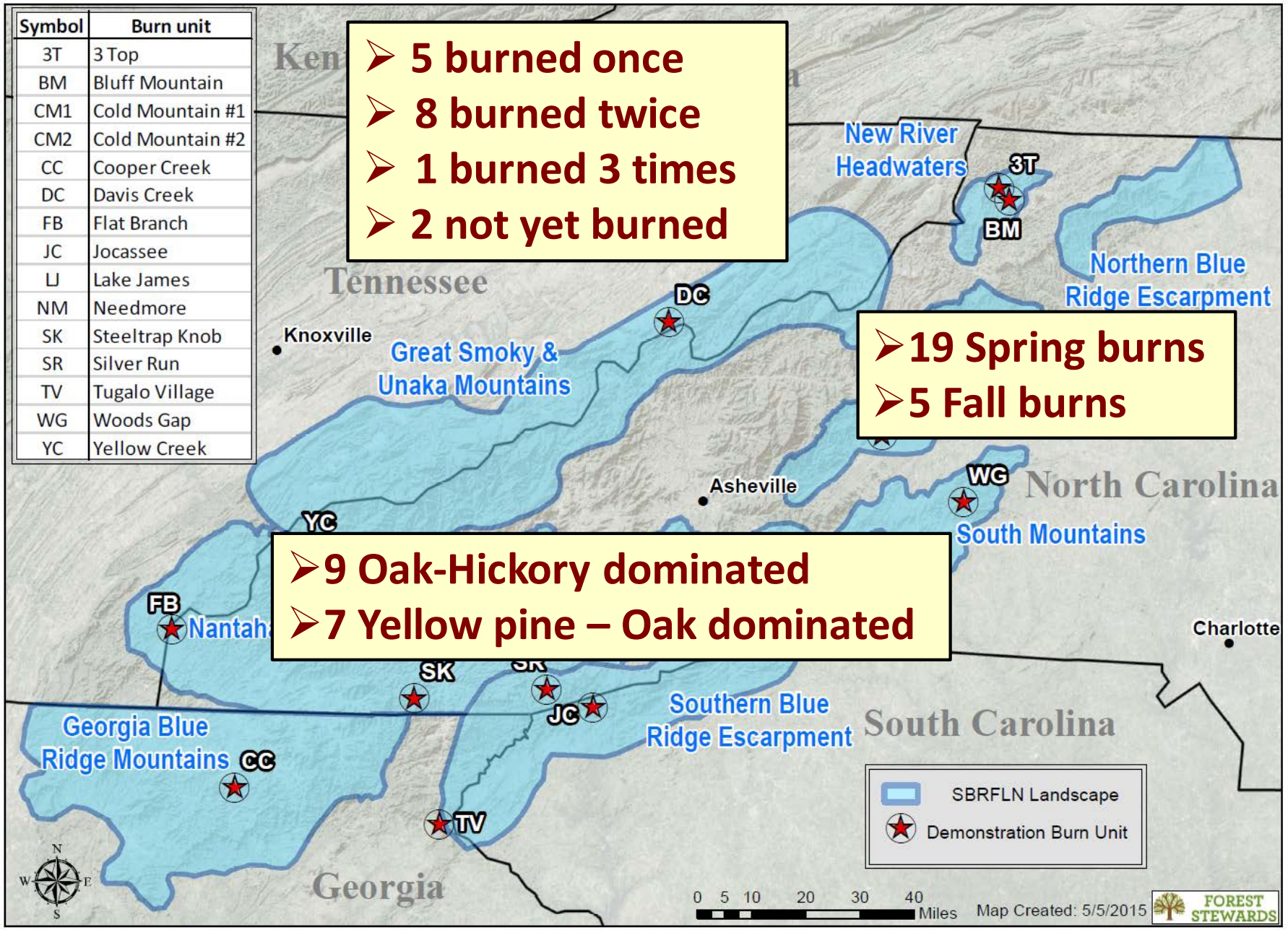
SBRFLN Demonstration Burn units (15 + 1)



Key monitoring questions

- **Fuels**
  - Fuels management (reduction in wildfire hazard)
  - Seedbed condition (forest regeneration)
- **Forest condition**
  - Stand density/structure
  - Species composition
    - Tree regeneration
  - Shrub layer density and composition
  - Herbaceous layer density and composition

SBRFLN Demonstration Burn units (15+1)



Fuels

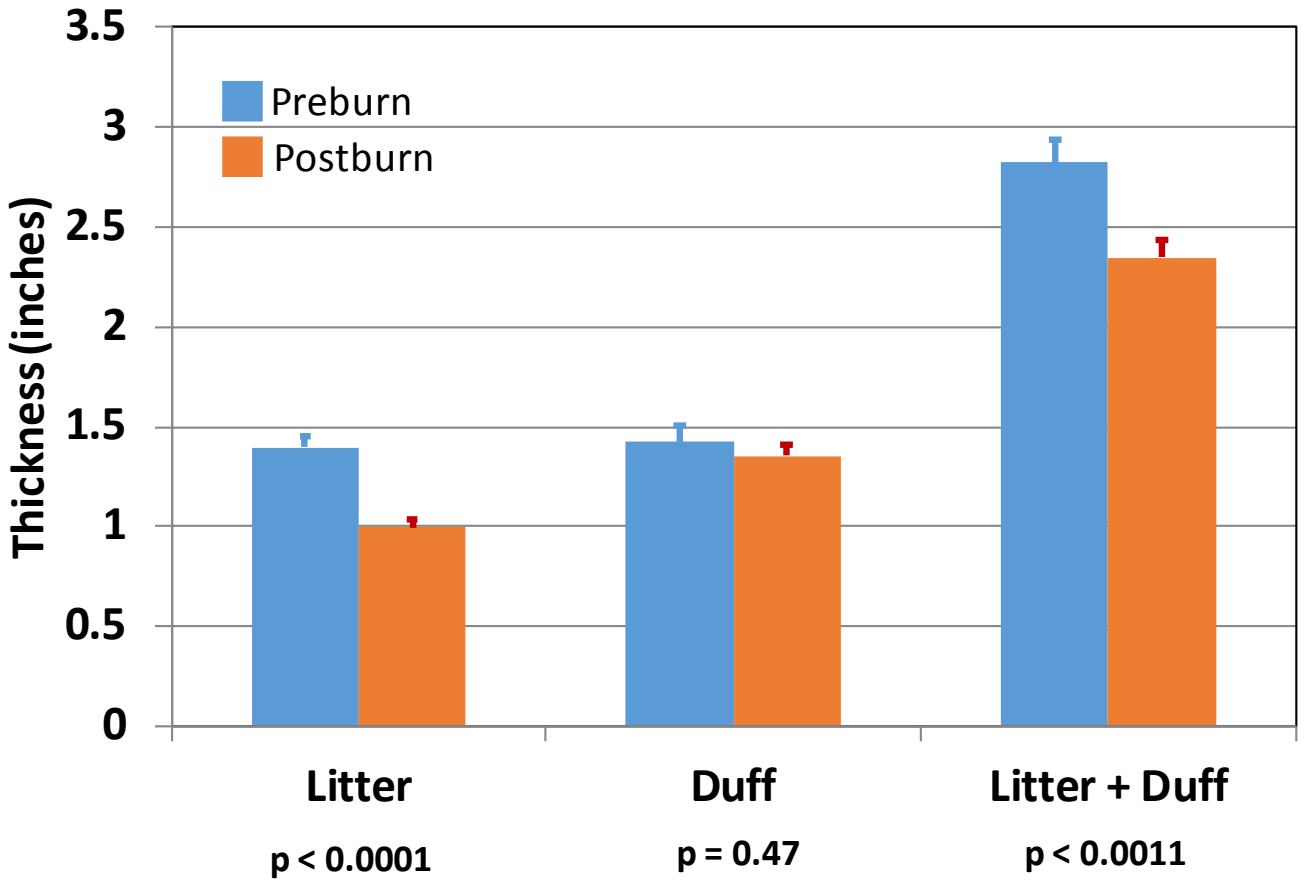
Methods:

- Brown's fuel transects
- 2nd growing season post burn

Goal: Monitor long-term trends as opposed to fire consumption

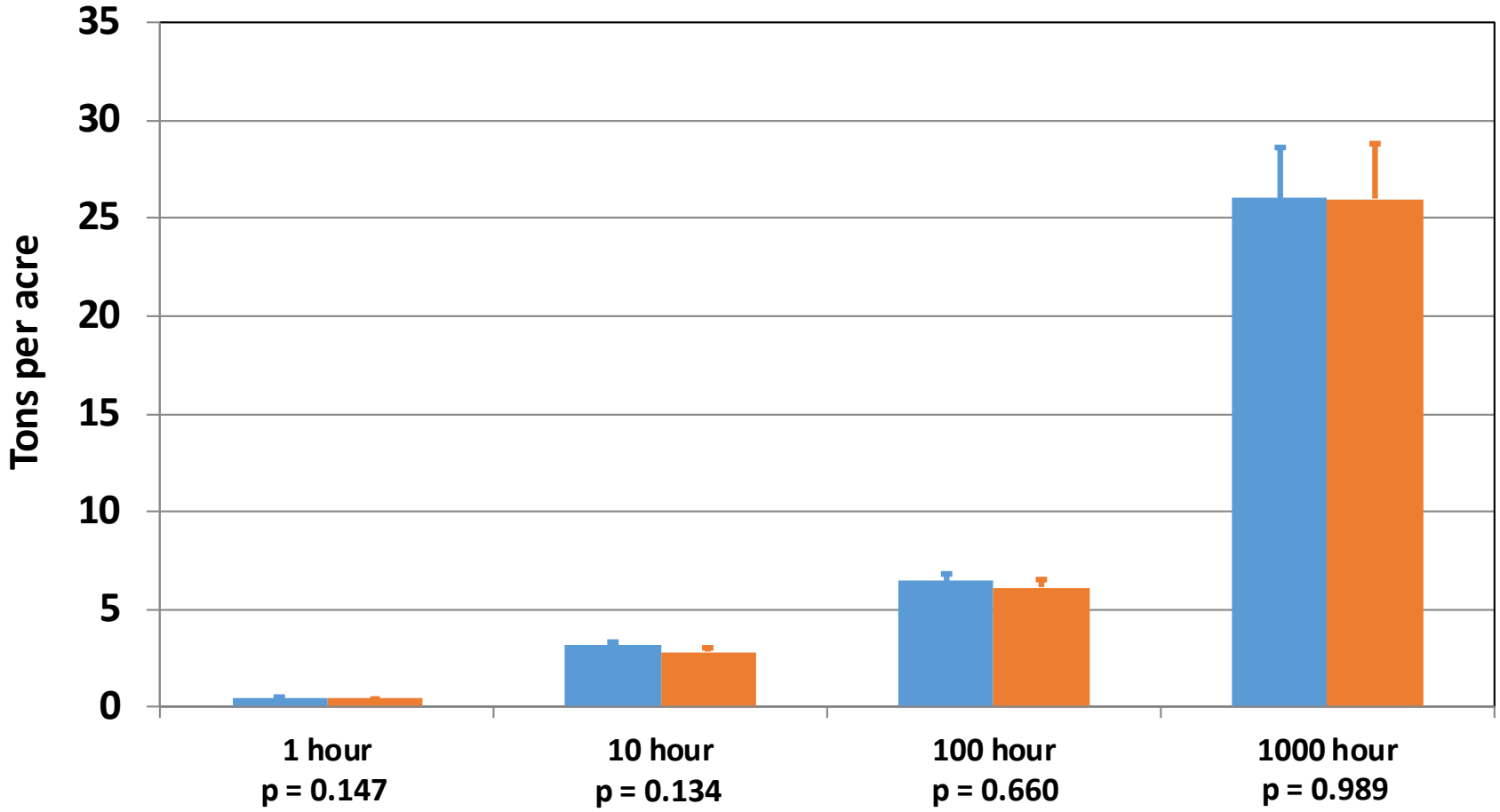
Fire effects on Fuels

Changes in ***litter and duff thickness*** following **a single burn**



Fire effects on Fuels

Changes in ***woody fuel weights*** following **a single burn**

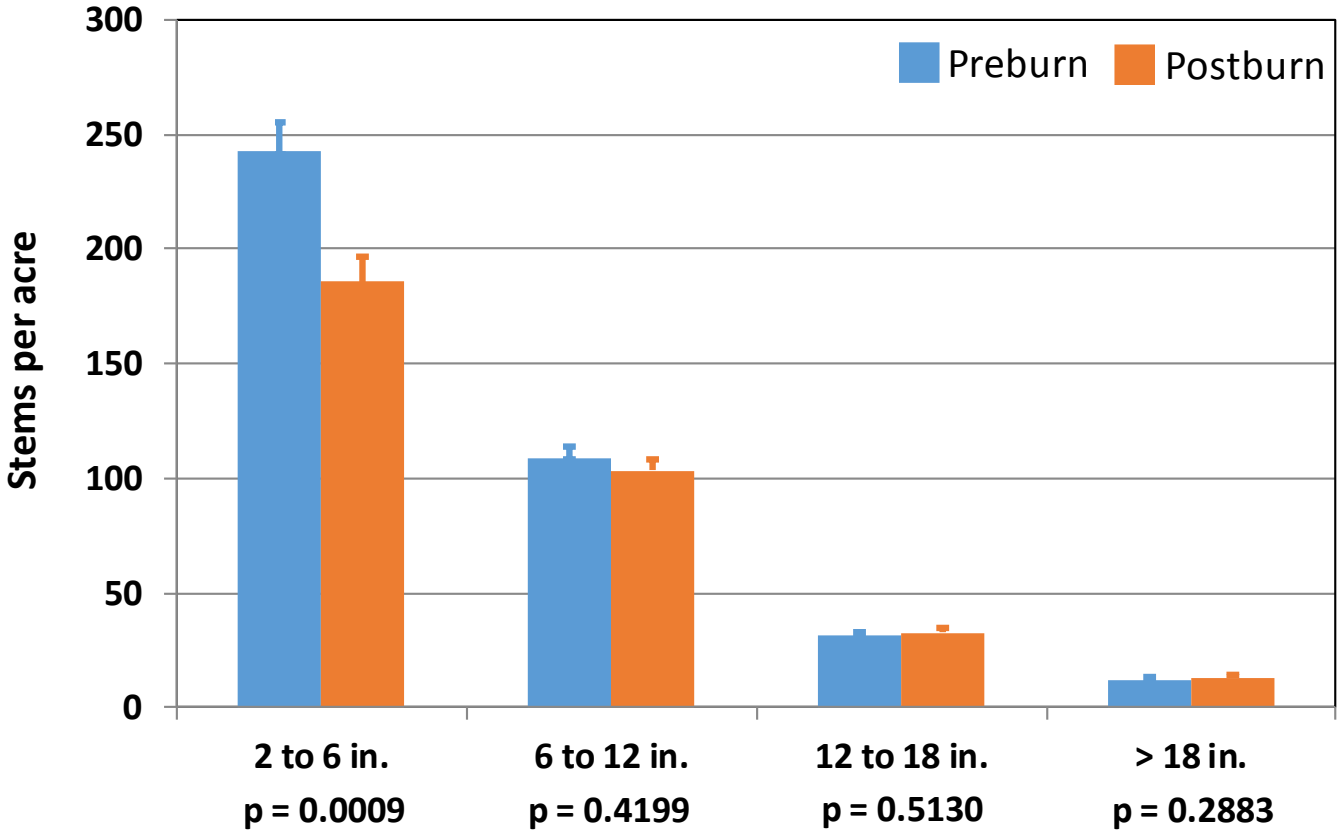


Overstory forest structure

<u>Methods:</u> Species, dbh, and crown class for all trees > 2 inches dbh in 1/10th acre plots

Fire effects on Overstory Structure

Changes in ***stem density*** **following a single burn** ***by DBH class***



More, larger tree die following two burns

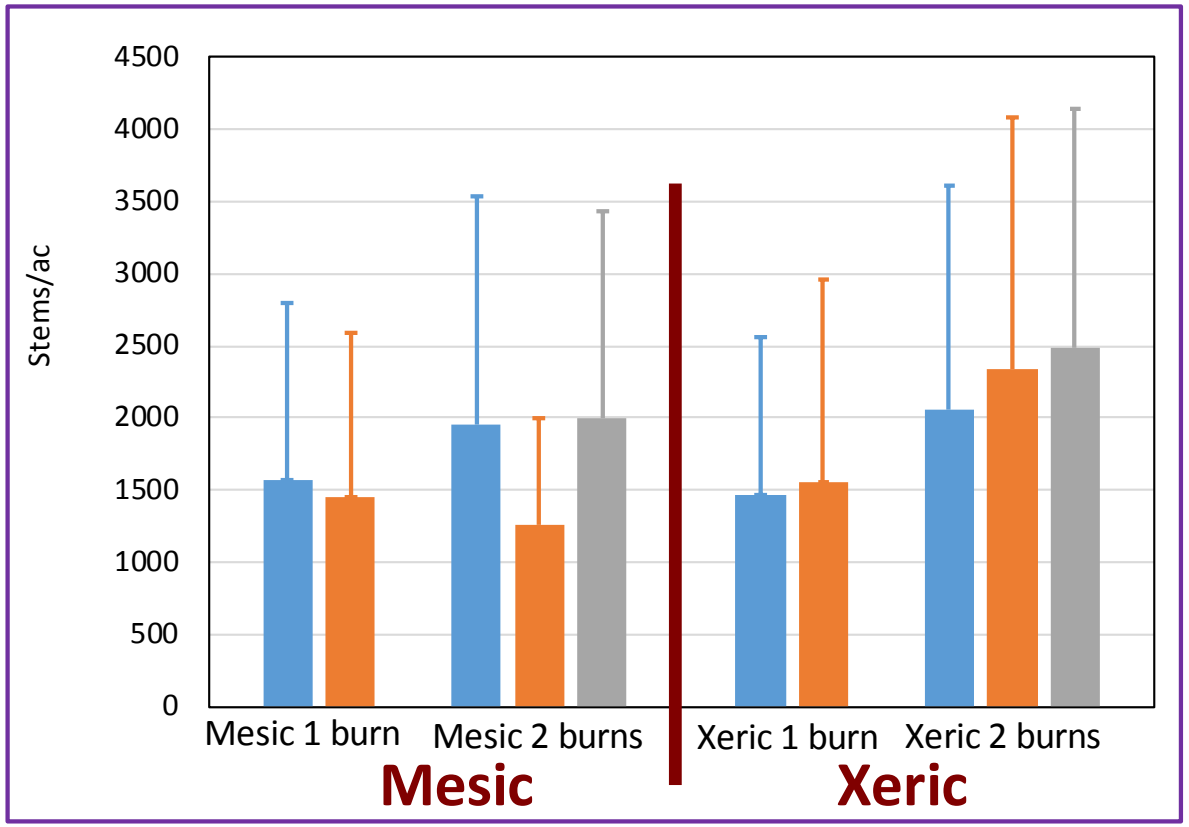
Diameter classes that were significantly reduced following one and two burns.				
Diameter Class (inches)	Units burned once	Units burned twice		
	Post 1st burn < preburn	Post 1st burn < preburn	Post 2nd burn < preburn	Post 2nd burn < post 1st burn
2 to 3	Yes	Yes	Yes	No
3 to 4	Yes	Yes	Yes	No
4 to 6	Yes	Yes	Yes	No
6 to 8	No	No	Yes	No
8 to 12	No	No	No	No
12 to 18	No	No	No	No
> 18	No	No	No	No

Forest Regeneration

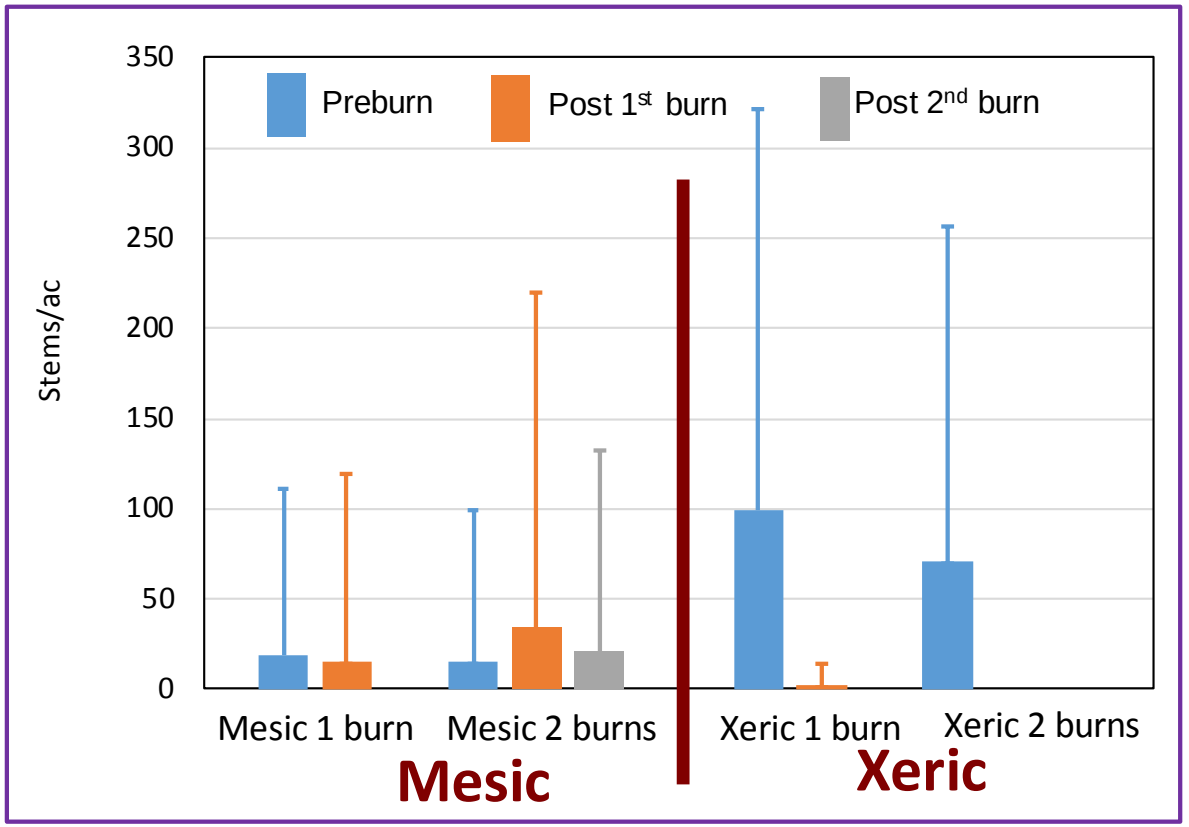
<u>Methods:</u> Talley of stems greater than 1 foot tall and less than 2 inches dbh

- **Sprout clumps were treated as a single plant**

Total regeneration density



Pine regeneration density



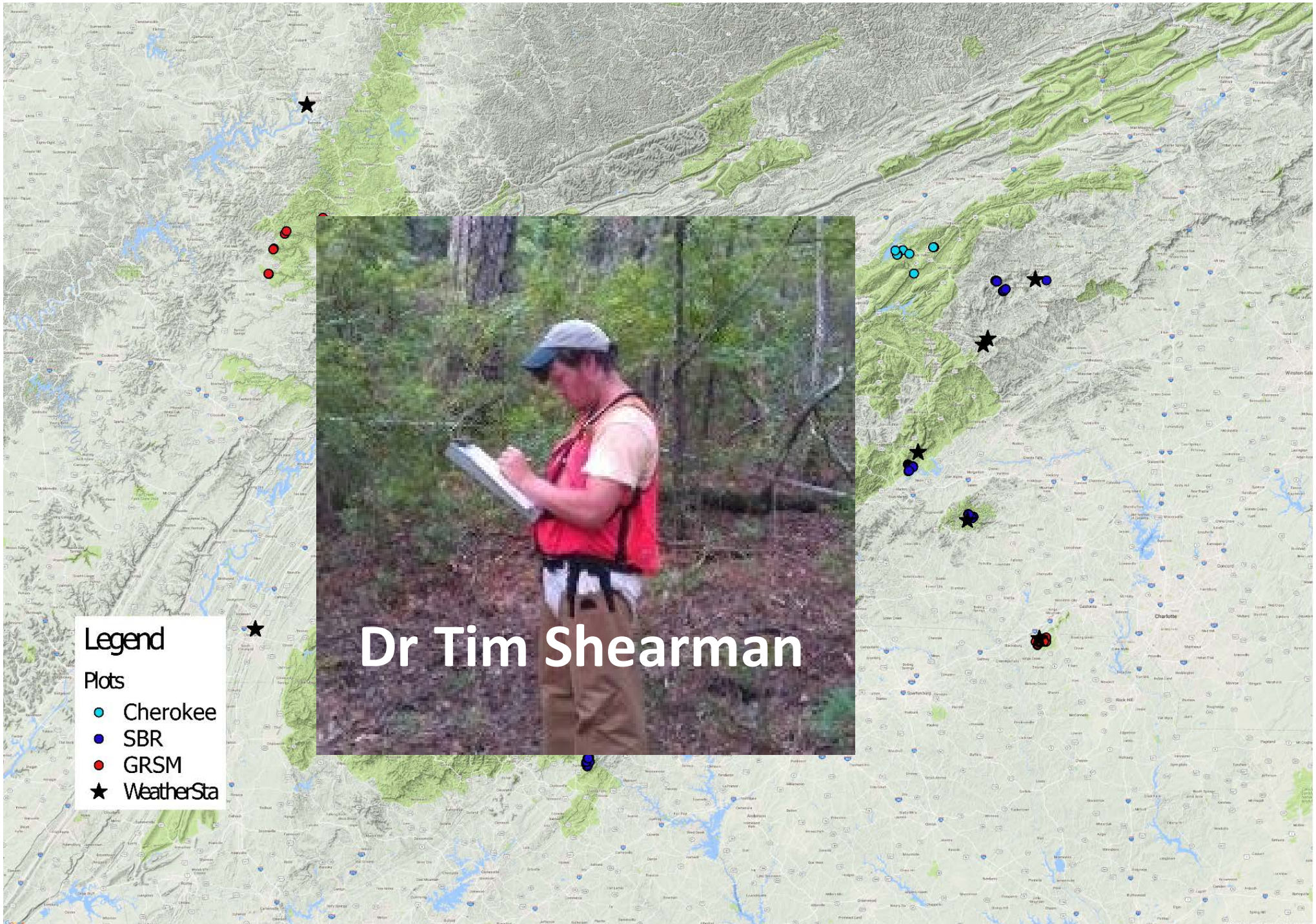
Mean and standard deviation of total regeneration density and pine regeneration density for plots burned once and plots burned twice for mesic and xeric communities.

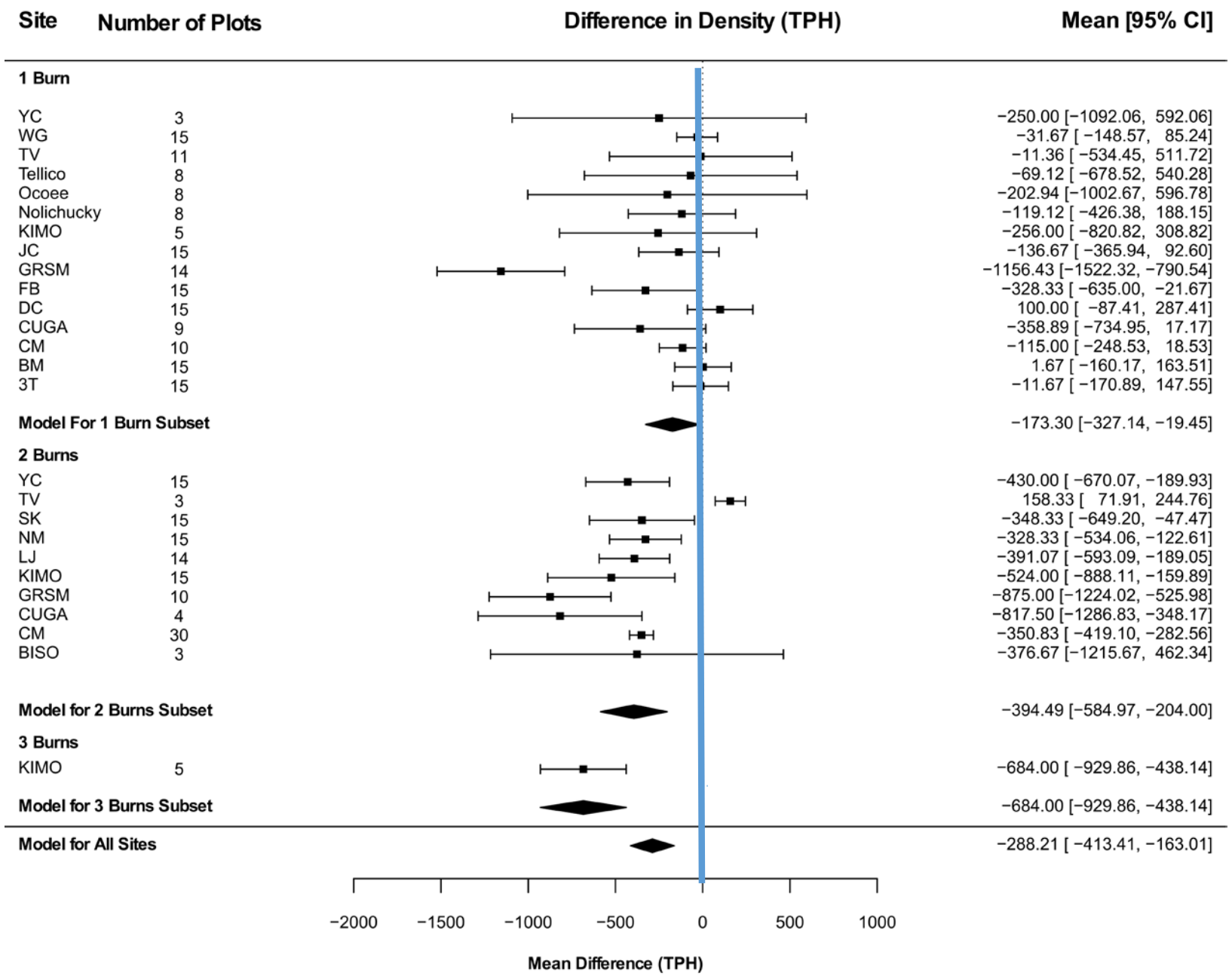
Forest community type is important

But it's complicated….

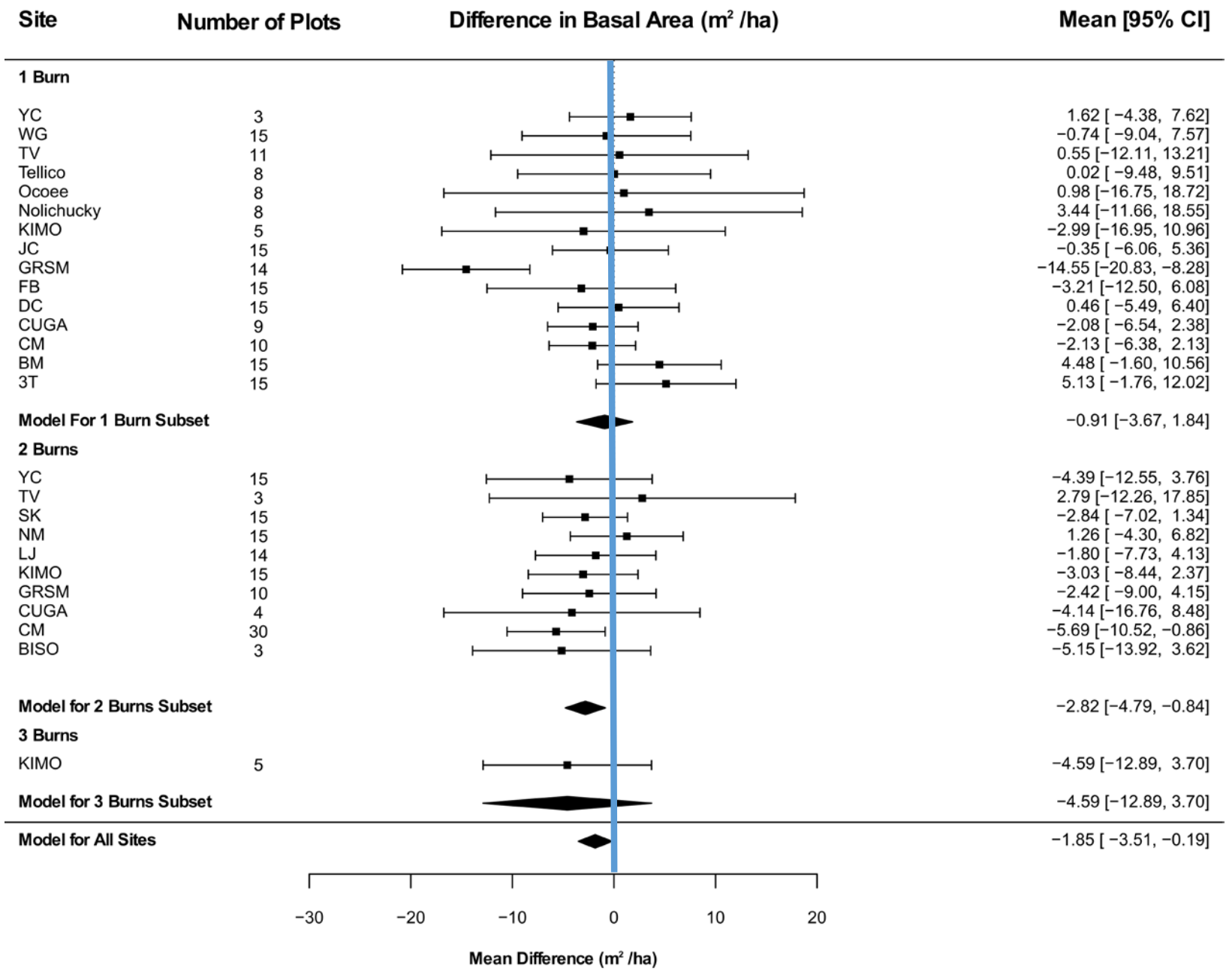
- **Season of burn**
  - Dormant season
  - Early growing season
  - Late growing season
- **Fire behavior**
  - Fire weather
  - Fuels
  - Topography
- **Initial forest condition**
  - Forest community
  - Forest structure
- **Number of burns**
- **Time since burn**

To learn more we need additional sites….

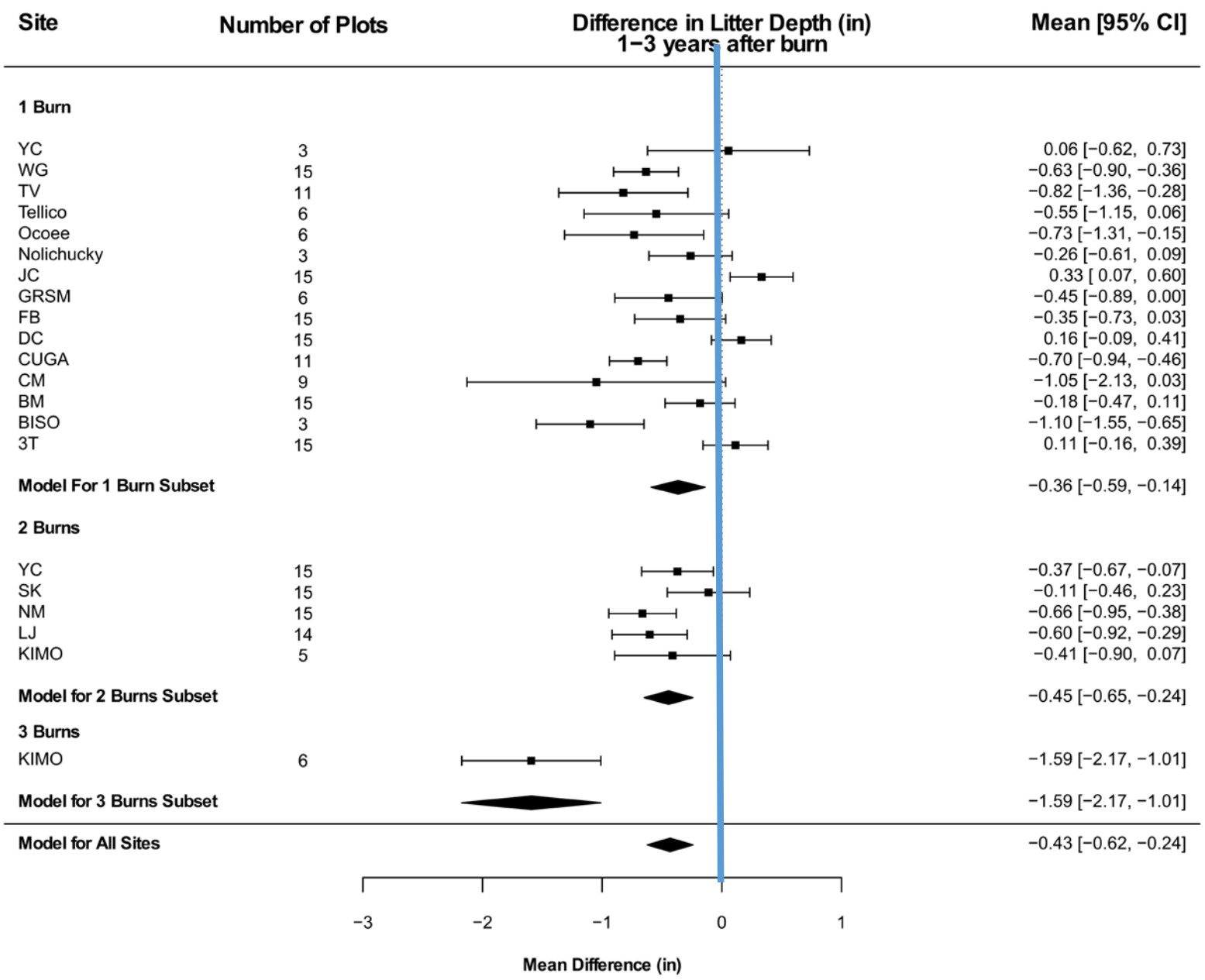

Dr Tim Shearman
Legend
Plots
Cherokee
SBR
GRSM
WeatherSta



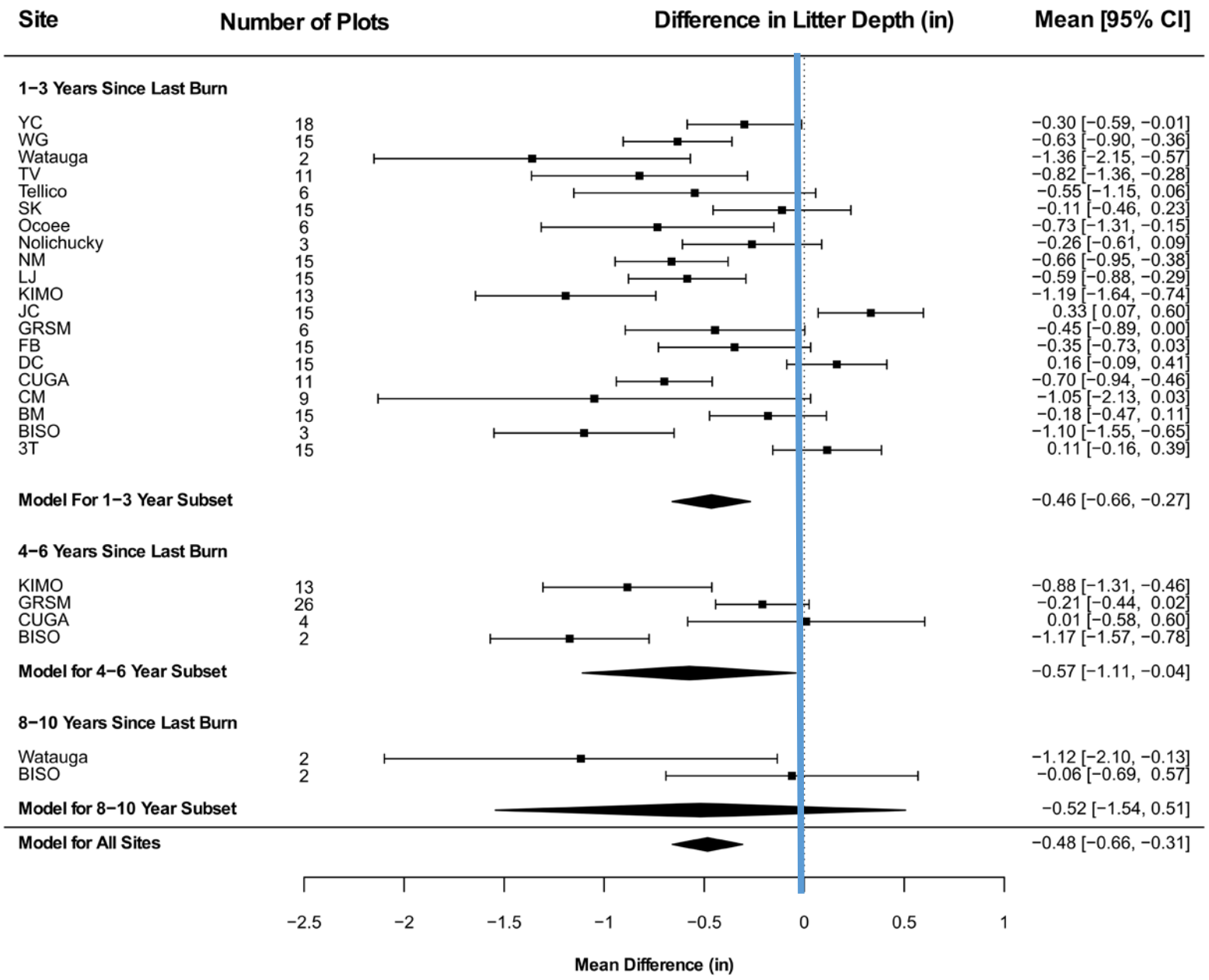
- Plots with only 1 burn were reduced by 60 trees/ac
- Plots with 2 burns were reduced by an average of 134 trees/ac
- Plots with 3 burns, had an average decrease of 277 trees/ac



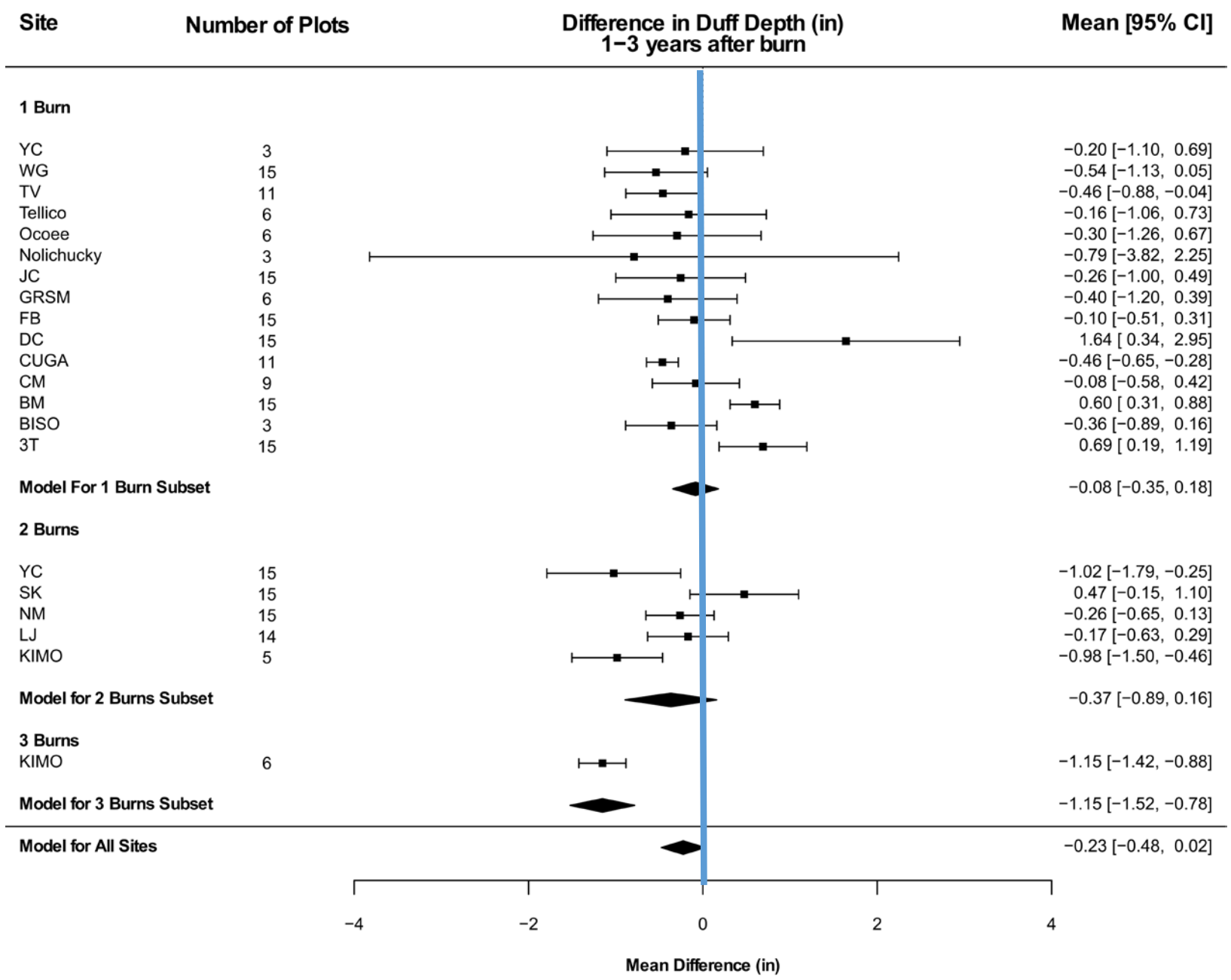
- 1 Burn had an average decrease in basal area of 3.4 ft^2/ac.
- 2 Burns had an average decrease of 7.3 ft^2/ac,
- 3 burns had an average decrease of 20 ft^2/ac.
- 7% of plots burned 1x had a reduction of at least 30%
- 17% of plots burned 2x had a reduction of at least 30%



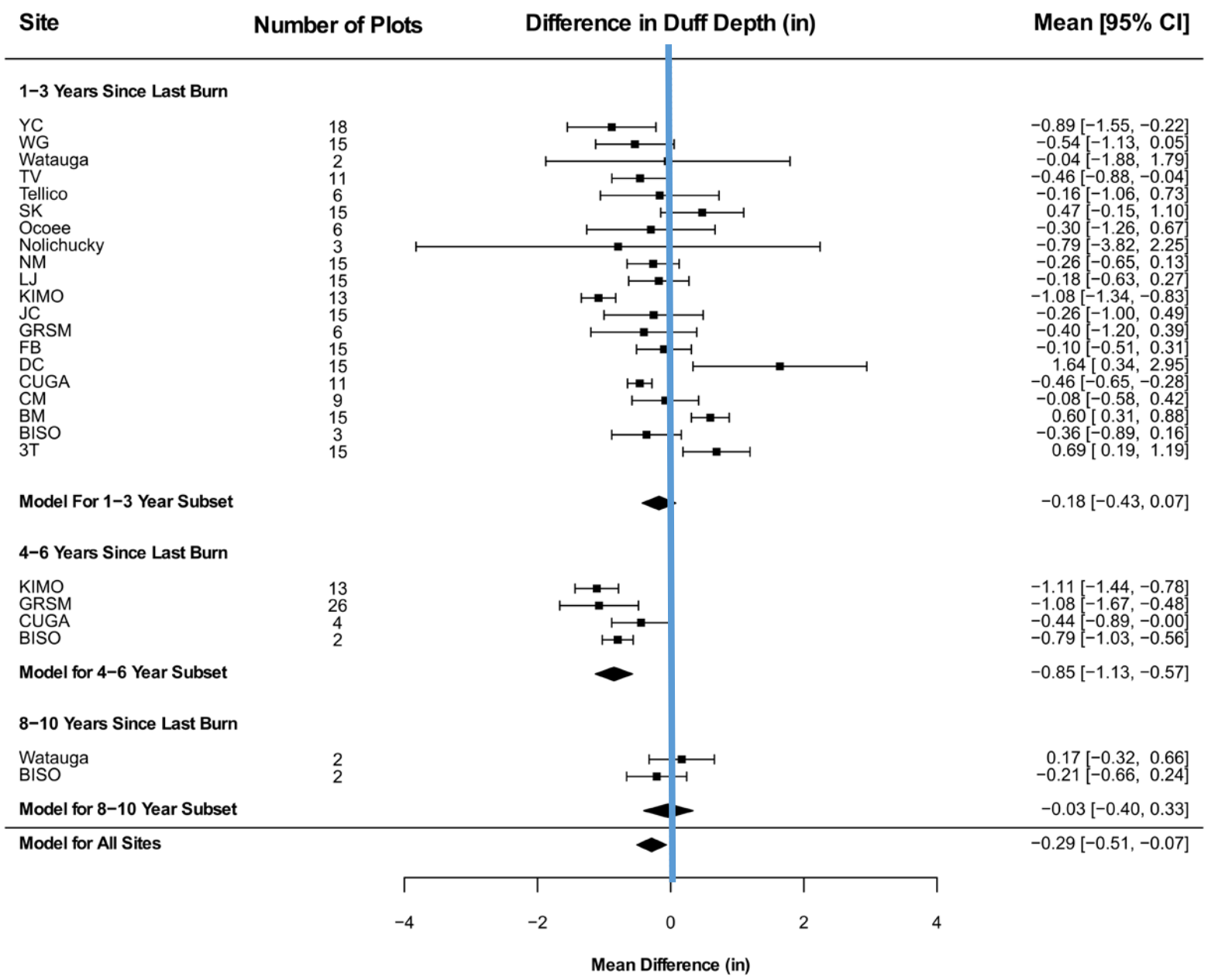
- Plots with 1 and 2 burns had a reduction in litter depth of 0.32 and 0.26 inches respectively.
- Plots with 3 burns had a reduction in litter of 1.59 inches, but again, this was a small sample size.



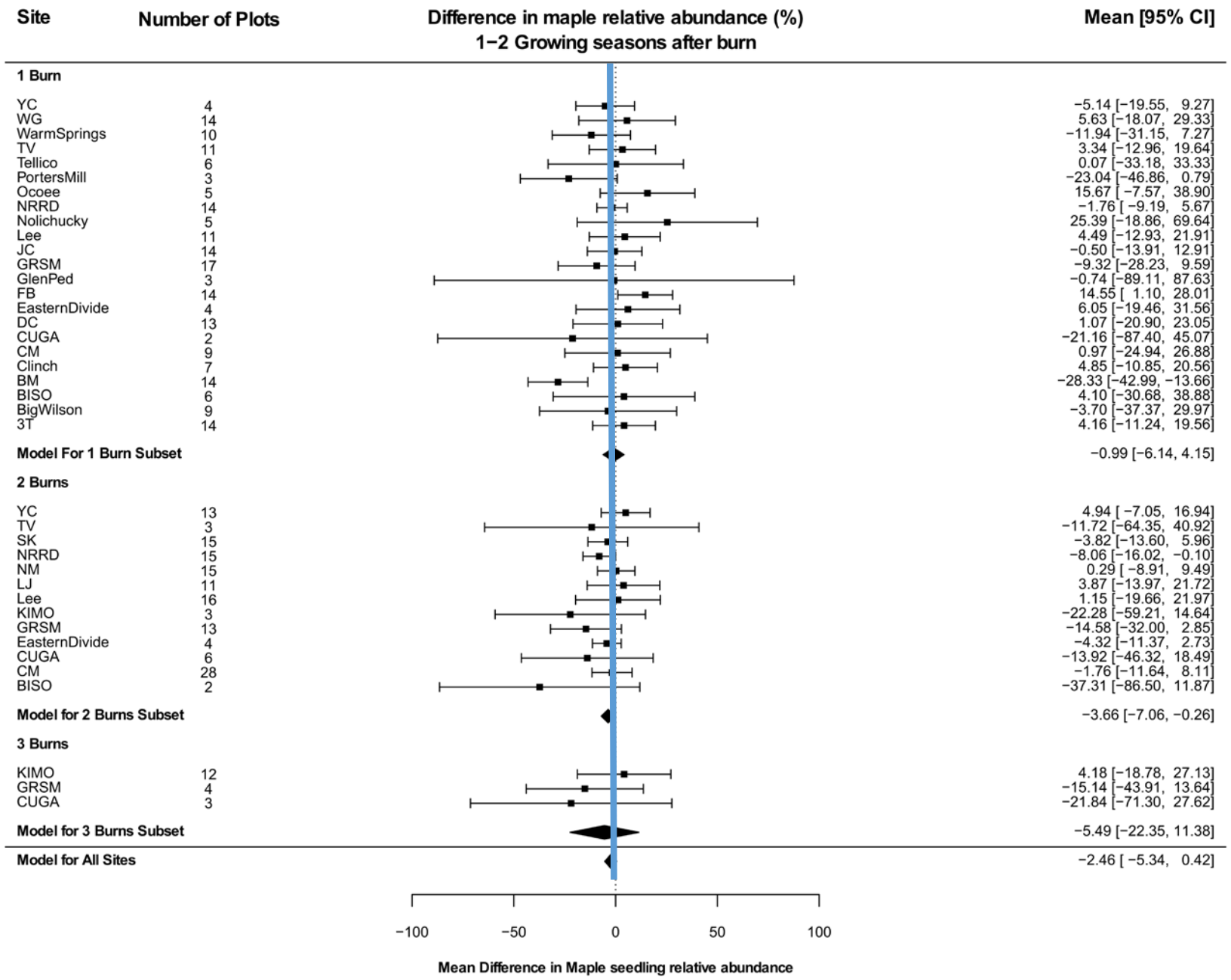
- Here, 1-3 years (regardless of how many burns) had an average decrease of 0.40 inches.
- 4-6 and 8-10 years post fire still had average reductions of litter depth of 0.57 and 0.43 inches, but they are increasingly more variable.



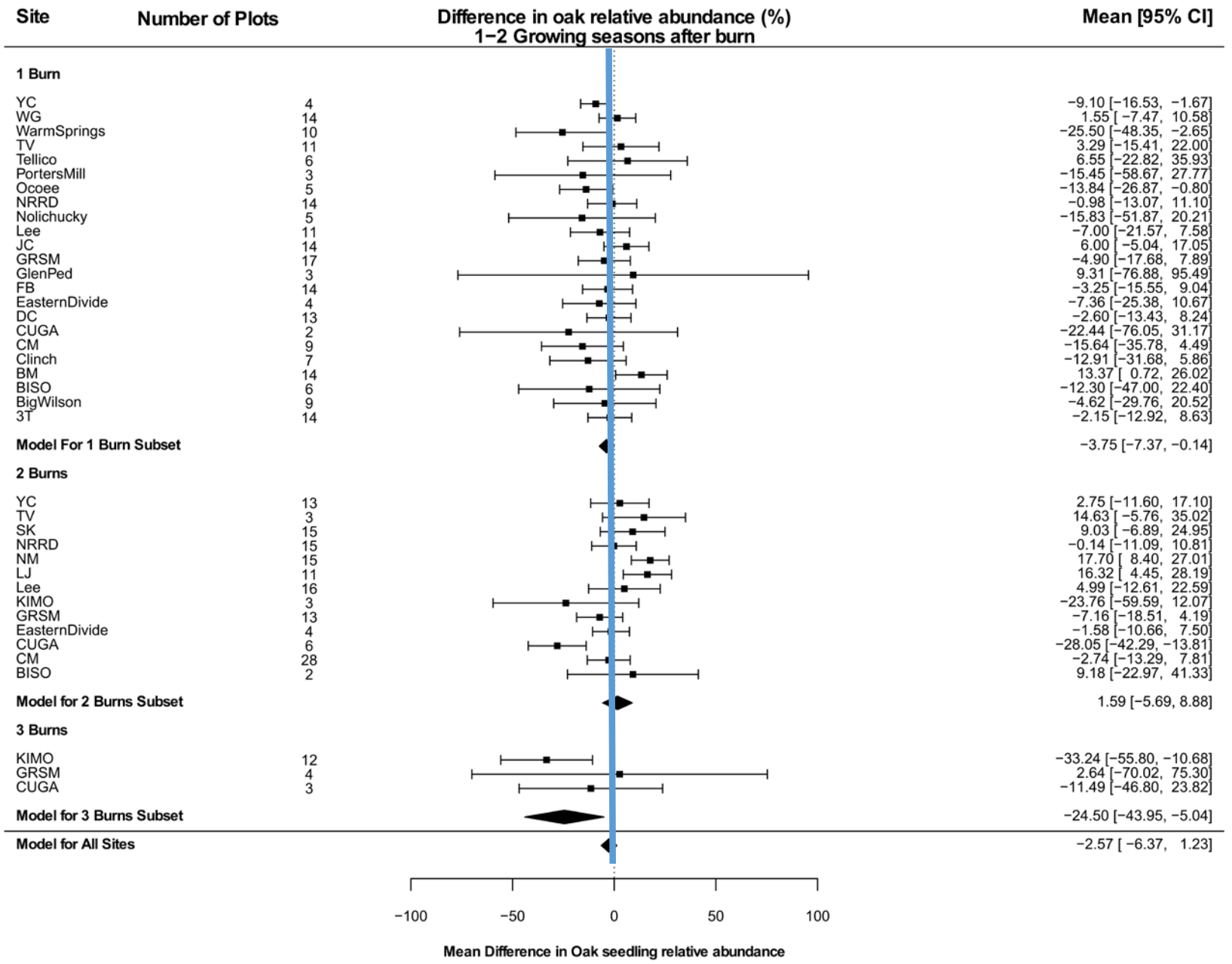
- Duff depth did not change significantly with the exception of the three burn plots.
- Plots with 1 burn had average reduction of 0.03 inches; 2 burns had reduction of 0.22 inches; 3 burns had reductions of 1.15 inches.



- 1-3 years after fire, duff was only 0.09 inches less thick than pre-burn measurements.
- 4-6 years after fire, duff was reduced by 0.85 inches.
- 8-10 years after fire, duff was reduced by 0.22 inches.



- 1 burn had a decrease in abundance of 0.56%
- 2 burns had a decrease in abundance of 2.5%
- 3 burns had a decrease of 4.9%
- Total *Acer* abundance down 7% in plots burned 1x, 51% in plots burned 2x



- 1 burn had a decrease of 2.5 % in oak seedling abundance.
- 2 burns had a 1.7 increase in oak abundance.
- 3 burns had a significant decrease of 22.74% in oak seedling abundance.
- Total oak abundance down 30% in plots burned 1x, 18% in plots burned 2x.

Possible changes that could be useful

- We need more data on fire intensity.
- There was some evidence in the analyses that weather data was useful, but some of the weather data were from stations too far away.
- Fuel moisture content would probably be useful as well.

Take home message

- Monitoring a cost-effective way to evaluate progress towards fire-related management goals.
- Data are heterogenous, and that’s a good thing.
- Trends are emerging, but few plots have been burned more than 2x.
- Monitoring is important! Let’s keep doing it.