

# Preliminary Results of a Fire History Study at Catoctin Mountain Park, MD

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# Why Study Fire History?

- Shows that fire was an important component of the forest in the past
- Provides context for how the current forest of fire-adapted species developed
- Identifies range of variation in historic fire characteristics, which is useful for burn managers today



Photo: North Atlantic Fire Science Exchange



# History of Catoctin Area

- Area around Thurmont was Algonquin & Lenape land prior to European settlement
- In the 18th Century it became Tuscarora (Iroquois Confederacy)
- First German settlers 1729
- Thurmont was incorporated as Mechanicstown in 1750's. Included German, Irish & enslaved African peoples
- Thurmont got its name in 1894.





- Catoctin Furnace 1774-1903
- In 1873, the furnace was converted to coal
- Catoctin Mountain Park was begun in 1936 by the CCC, finished 1954 & run by NPS



19th century view of Catoctin Iron Works.

*Courtesy of the Maryland Department of Natural Resources*



# Fire Suppression

- Weeks Act, 1924
- Advances in technology after World War II
- Ecological changes in former fire-adapted forests:
  - Loss of reproduction of fire-adapted pine & oak species
  - Mesic shade tolerant species increase

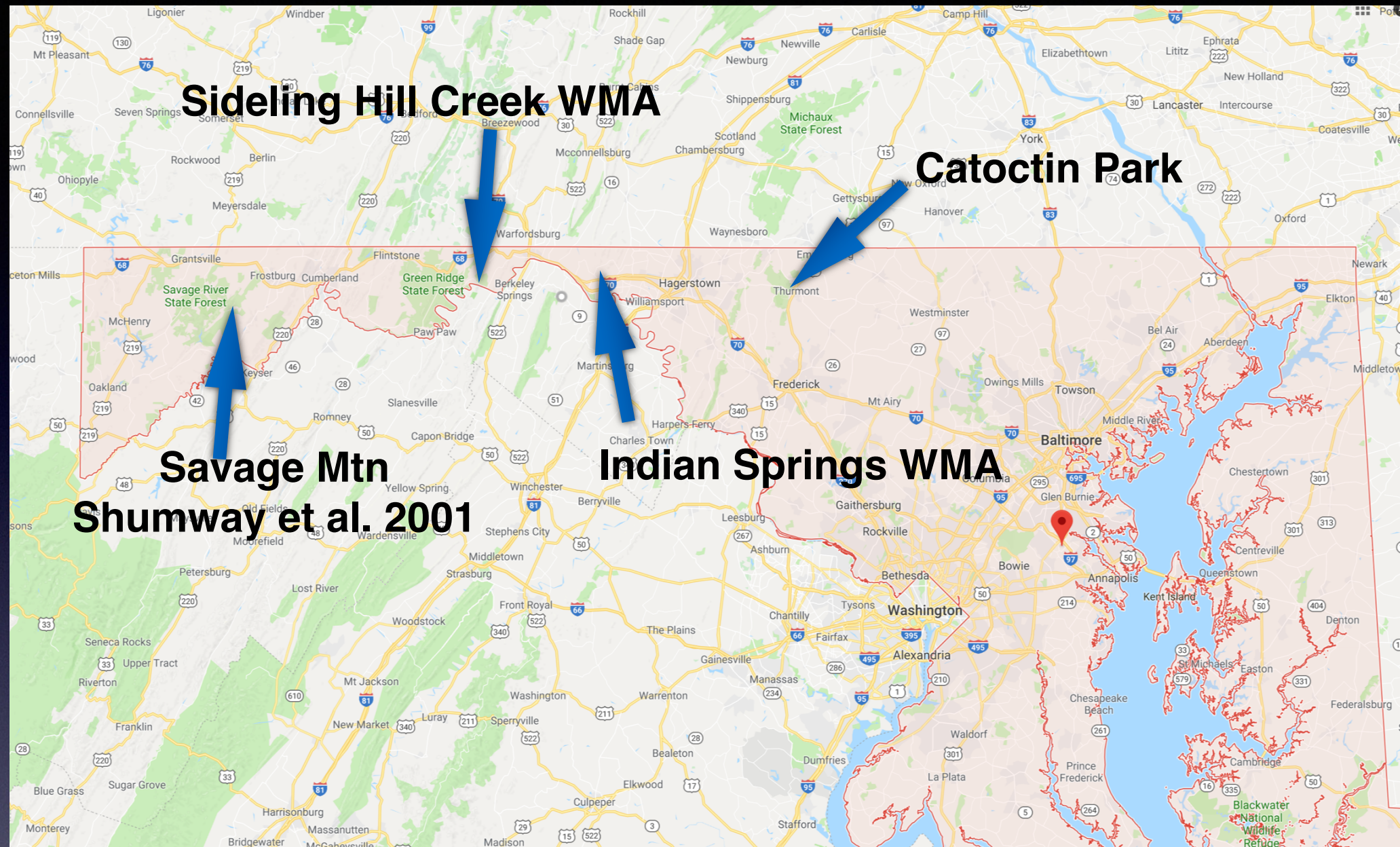




# Purpose of This Study

- Fire history information will aid in the design of controlled burn strategies in Maryland
- The only fire history study so far in MD is Shumway et al.'s Savage Mountain study (2001)
- Hypothesis 1... frequent fire (10-20 year intervals) prior to fire suppression era, then drop off > 1920
- Hypothesis 2... fire adapted species may not have many small stems, but mesic species might

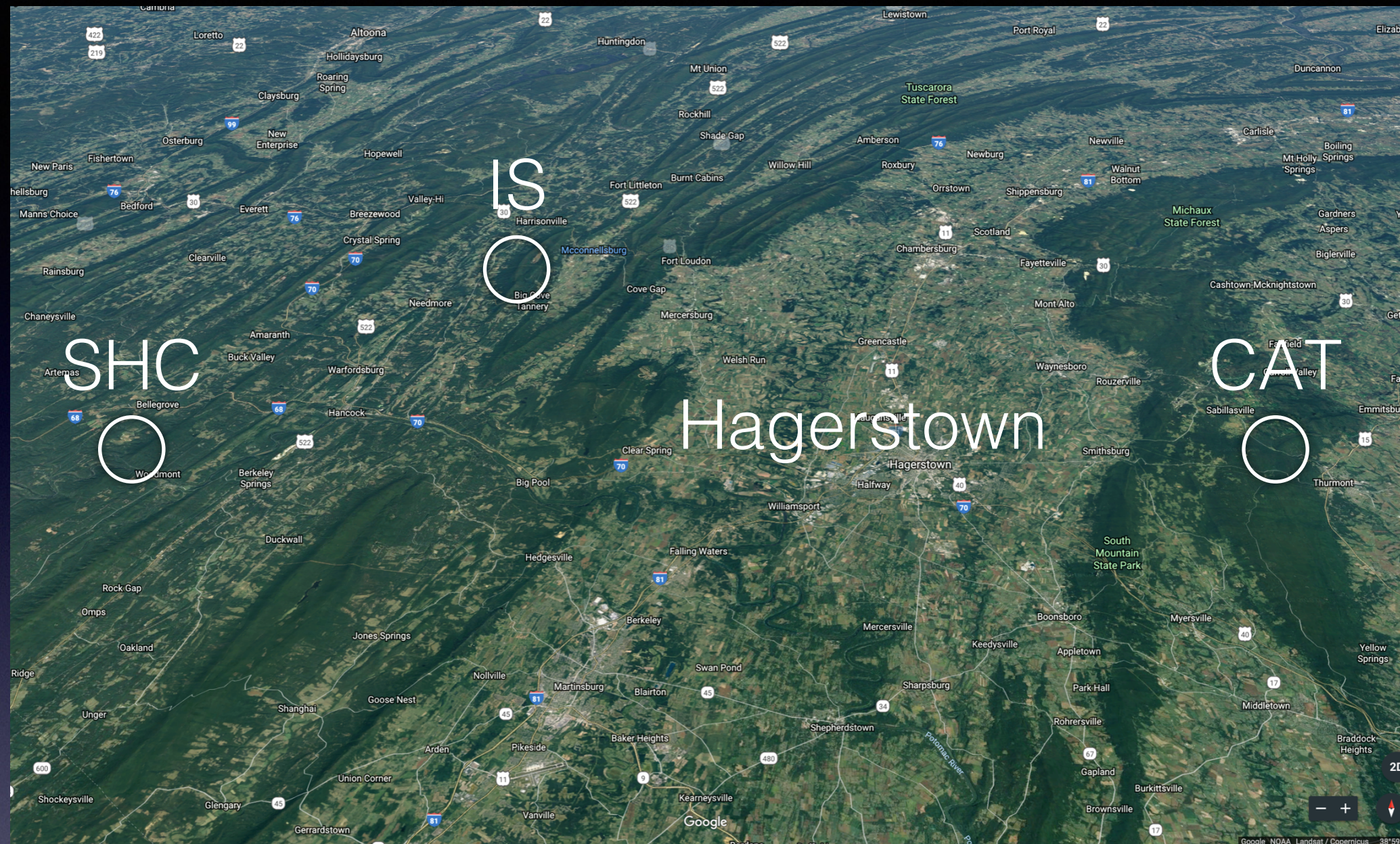




# Locations of 3 Study Areas in MD

The goal was to cover western part of the state to the east of Shumway et al.'s 2001 study of Savage Mountain.





# Locations of 3 Study Areas in MD

Study areas were in the Ridge & Valley region, east of the Allegheny Front at Cumberland.





# Sideling Hill Creek WMA

We looked for evidence of fire on piney west- and south-facing slopes.





# Indian Springs WMA

We looked for evidence of fire on piney west- and south-facing slopes.





# Catoctin Park

We looked for evidence of fire on piney west- and south-facing slopes.



# Field Work

- Located all fire scarred trees in a 1 square km area on south- or west-facing slopes
- GPS, aspect, dbh, species ID
- Collected section or partial section
- Characterized vegetation in 2, 500-m<sup>2</sup> circular plots
- Cored all trees > 4" dbh for age structure







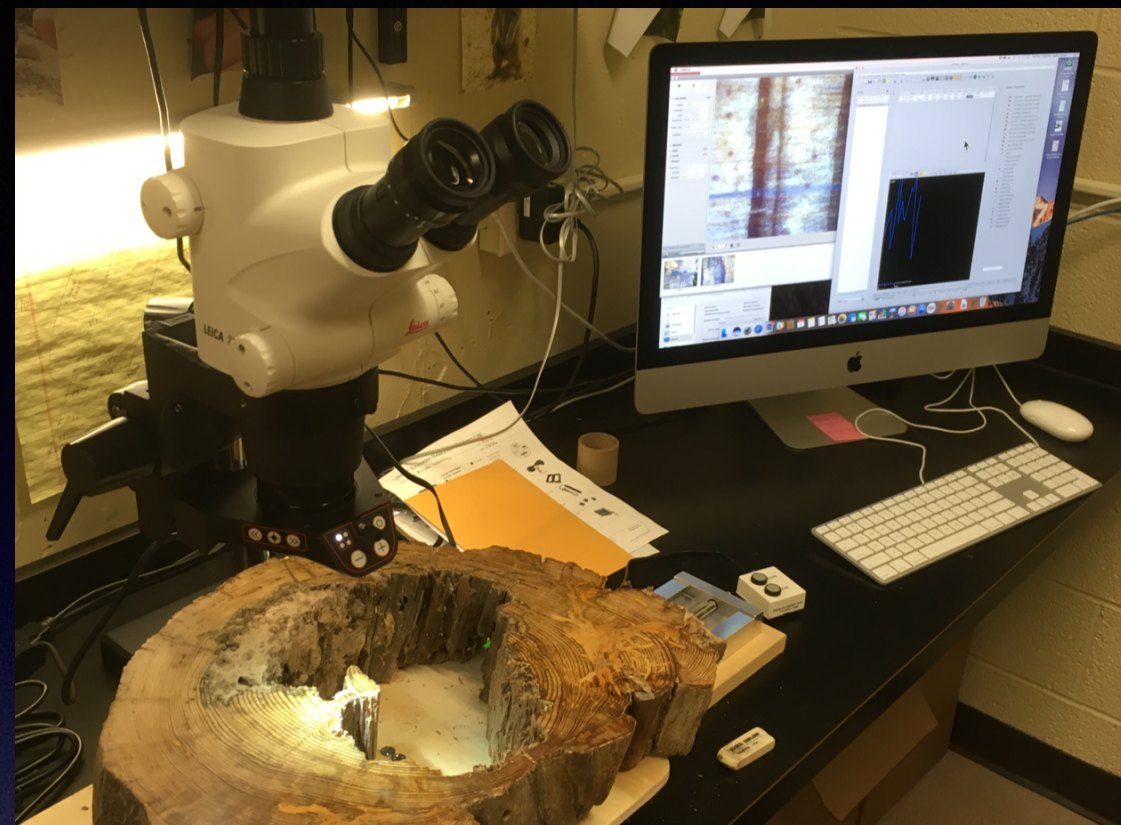


# Laboratory Analysis

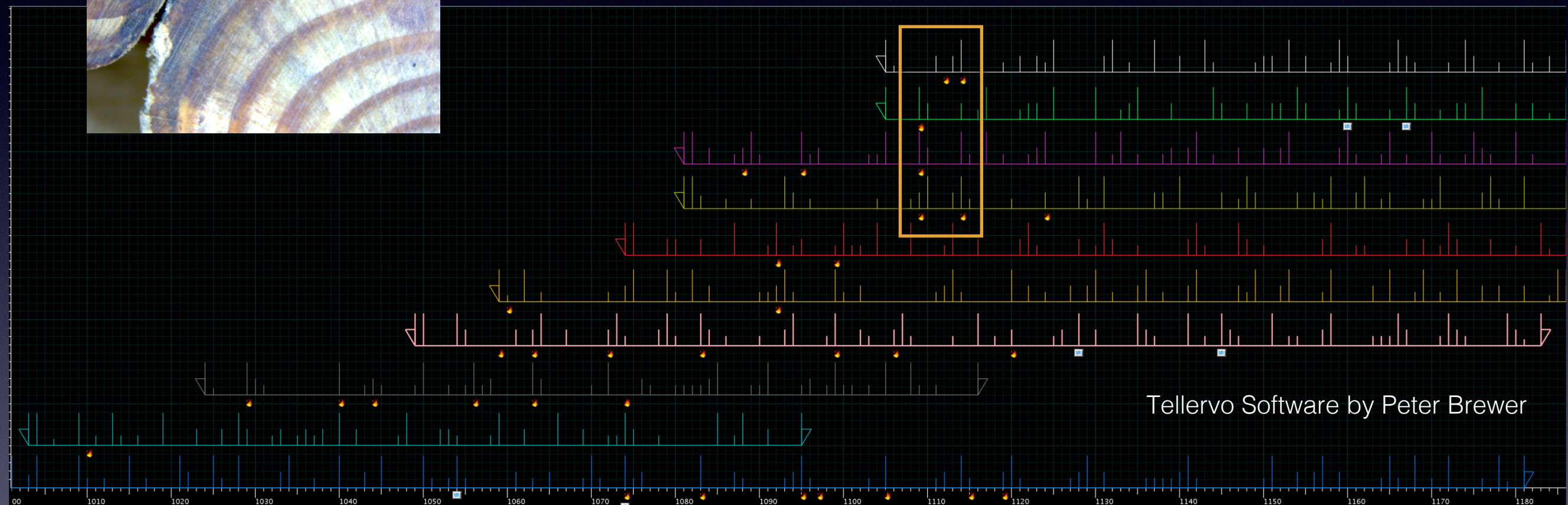
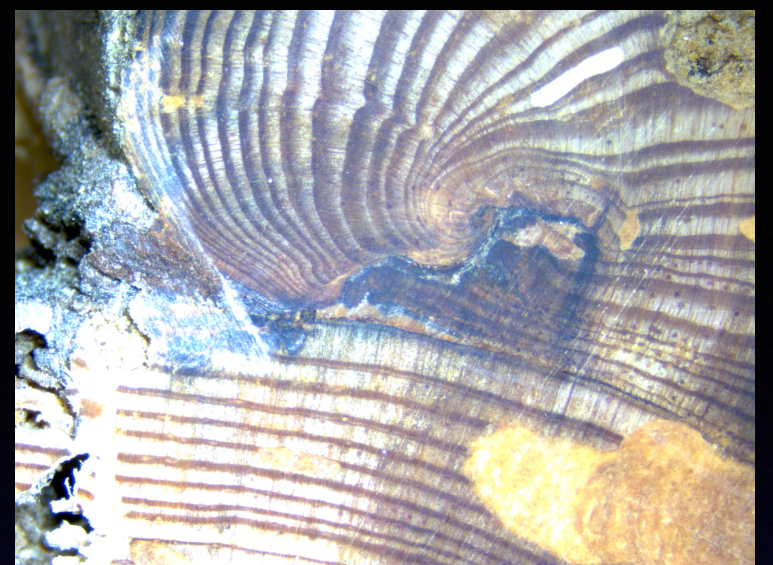
- Sand cross sections smooth with multiple grades of sandpaper to 400-600 grit
- Measure annual ring widths using a Velmex stage, microscope, and computer
- Cross-date samples to check for missing or false rings
- Identify years and seasons of fire scars on the samples











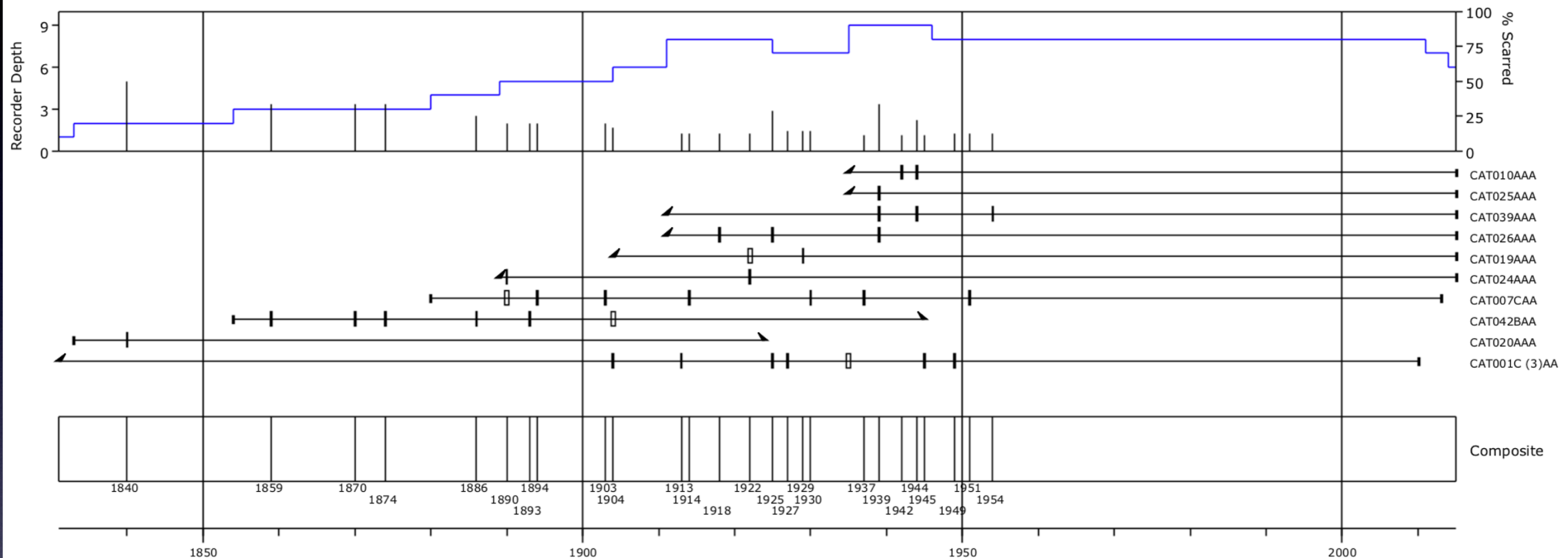
# Crossdating the Samples

Skeleton Plots showing years with narrow rings on a timeline  
Fire scars are the flame icons



Catoctin Mountain Park

MFI = 4.6 years, WMI = 3.6 years



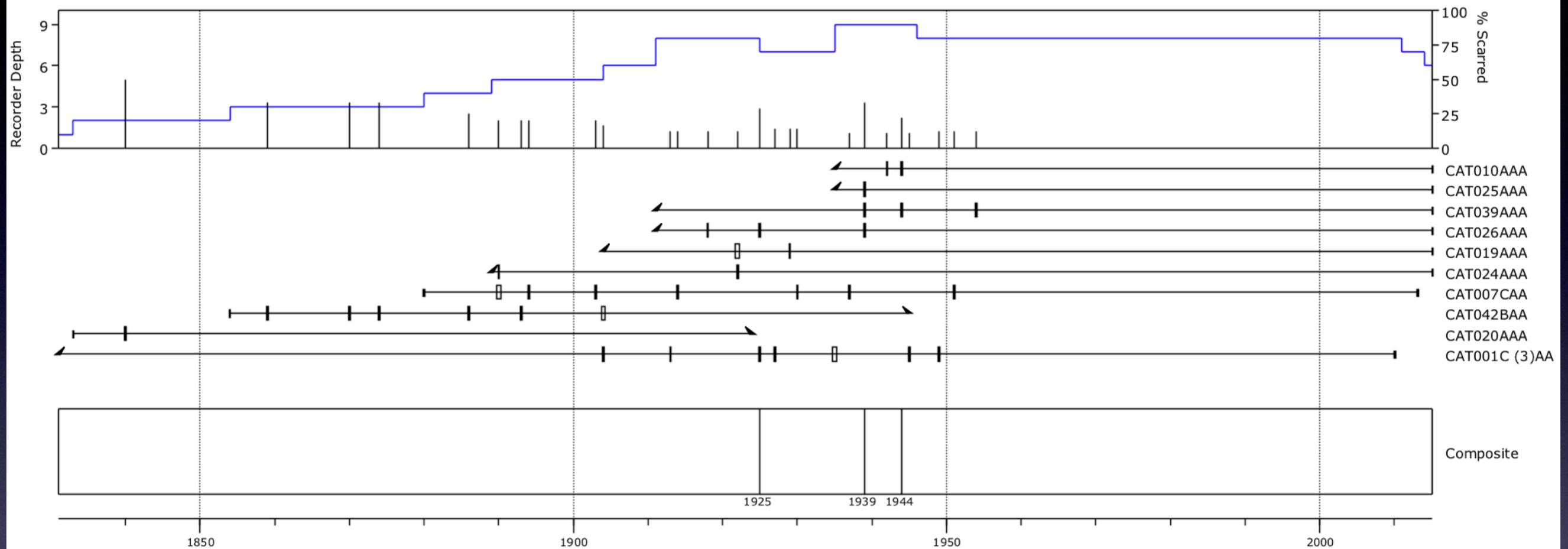
# Fire History of Catoctin

FHX2 diagram generated by FHAES software  
Results are preliminary. I have about 30 more trees on deck.



Catoctin Mountain Park

3 fires scarred 2 or more trees

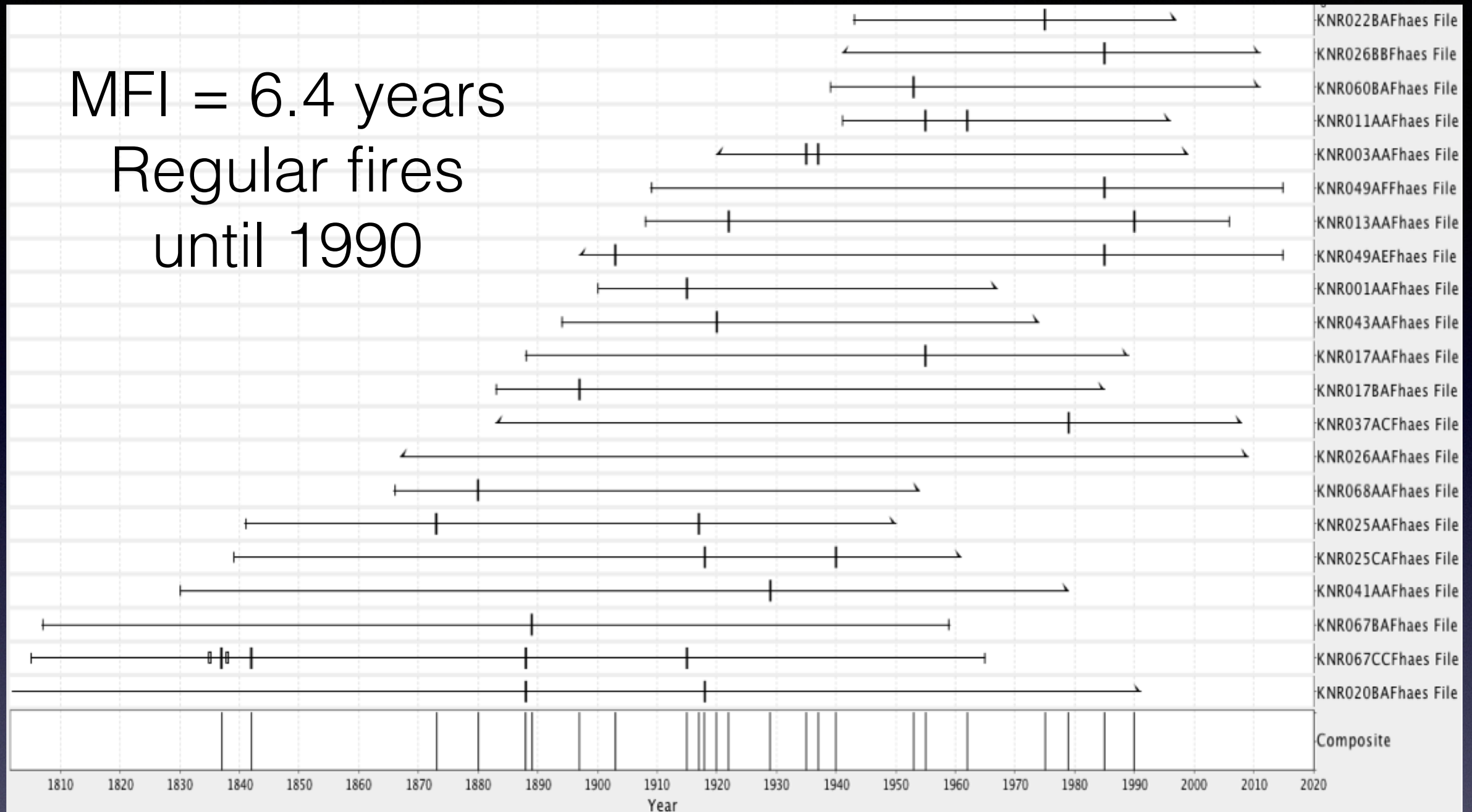


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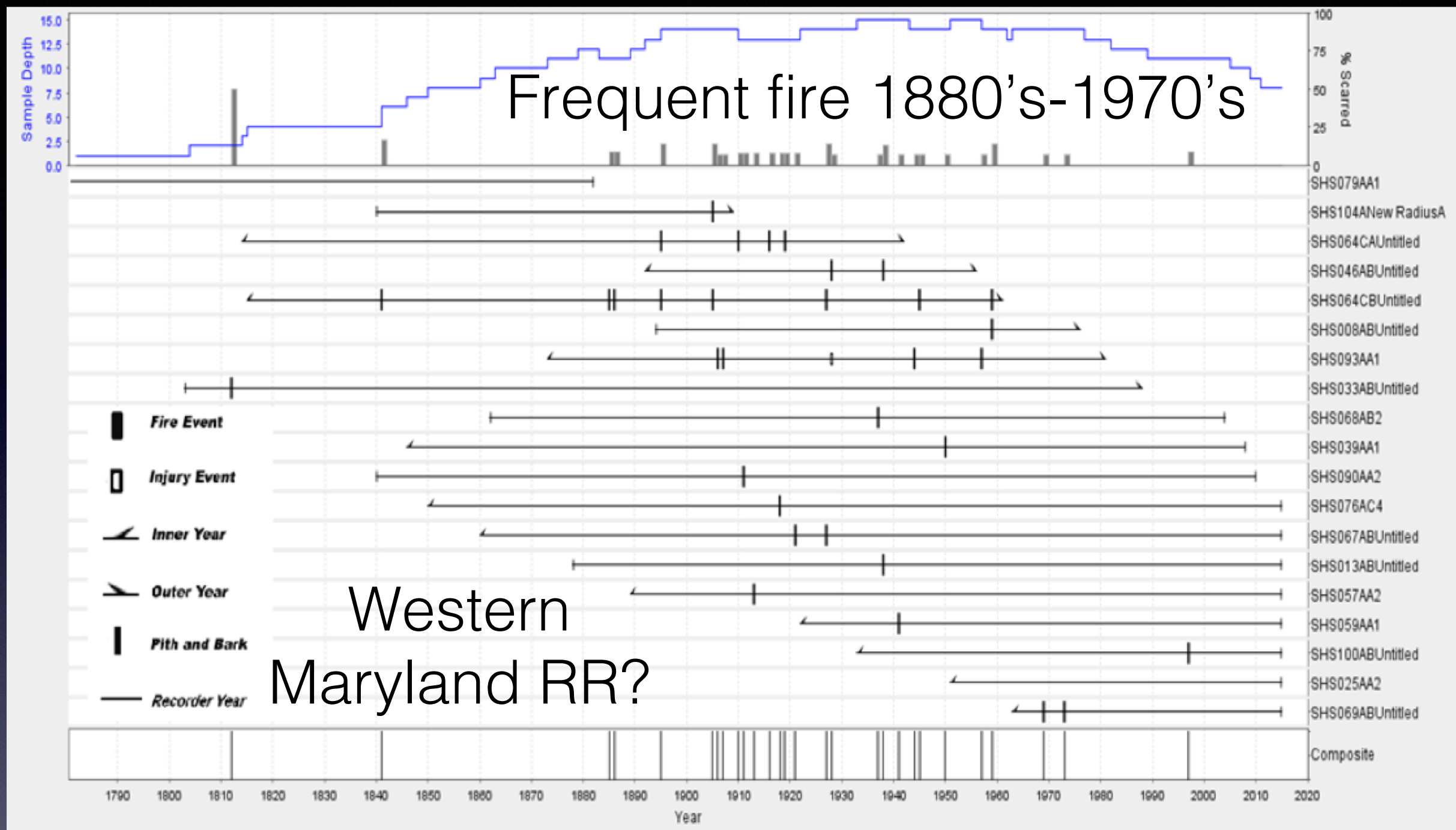
MFI = 6.4 years  
Regular fires  
until 1990



# Fire History of Indian Springs WMA

FHX2 diagram generated by FHAES software  
Results are preliminary. I have about 20 more trees on deck.





# Fire History of Sideling Hill Creek WMA

FHX2 diagram generated by FHAES software  
Results are preliminary. I have about 50 more trees on deck.



# Seasonality of Historic Burns

- Dormant season burns (after leaf-fall or before leaf-out) are the most common
- At Indian Springs, dormant burns accounted for 77% and 53% of burns before & after 1920, respectively. —→
- At Catoctin, 30 of 31 (97%) fire scars examined were dormant season (1 earlywood scar).

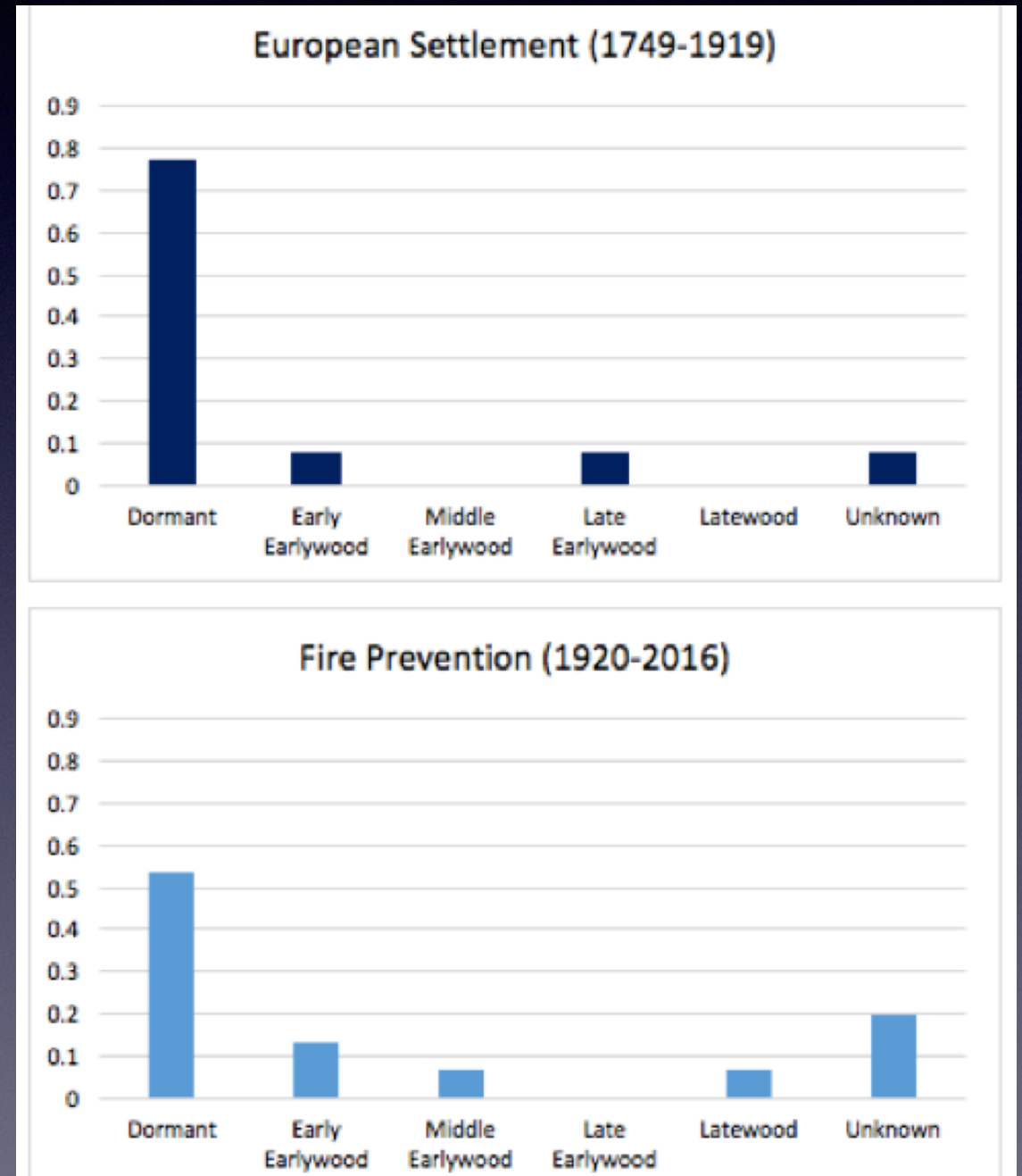
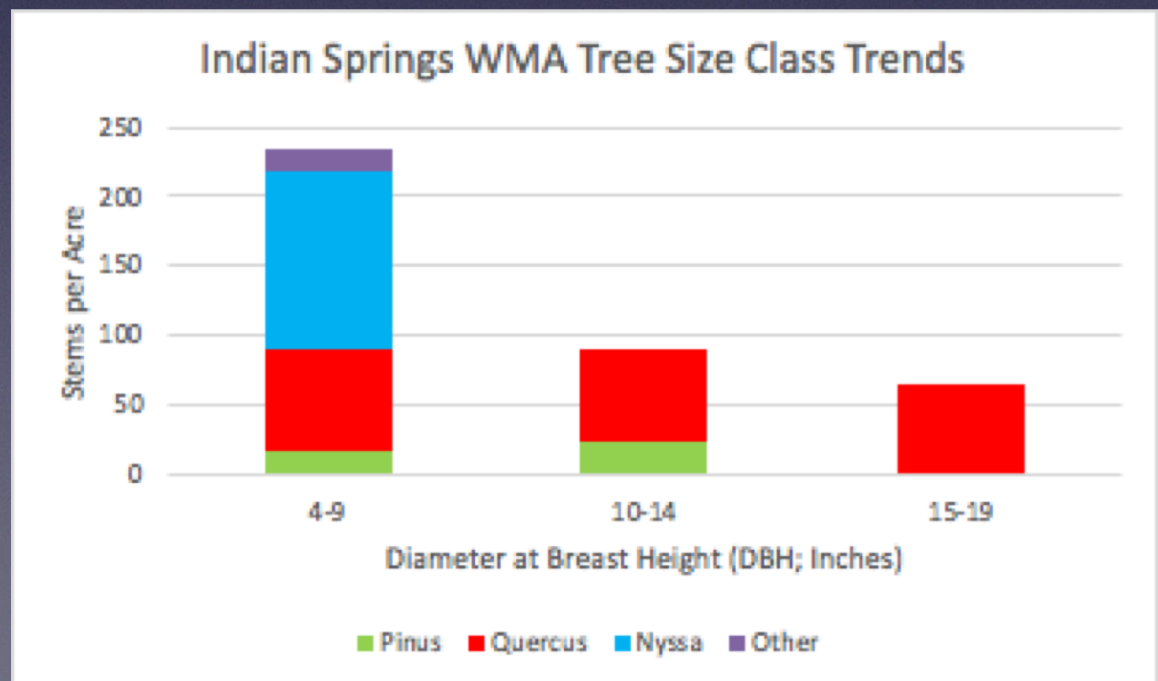
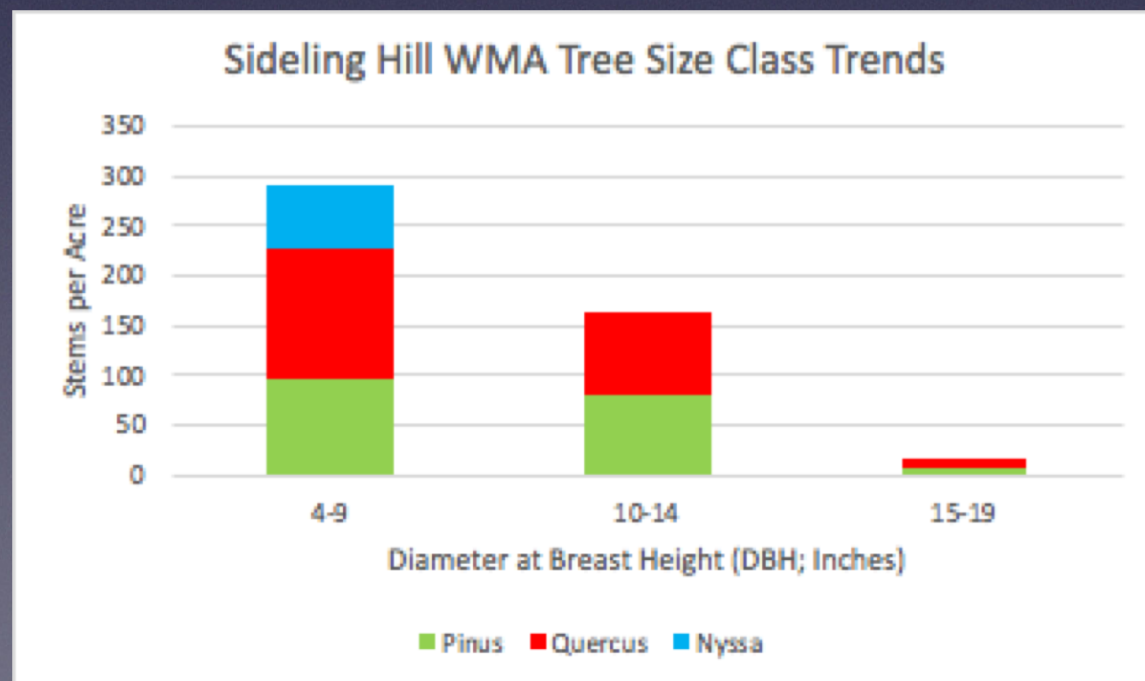
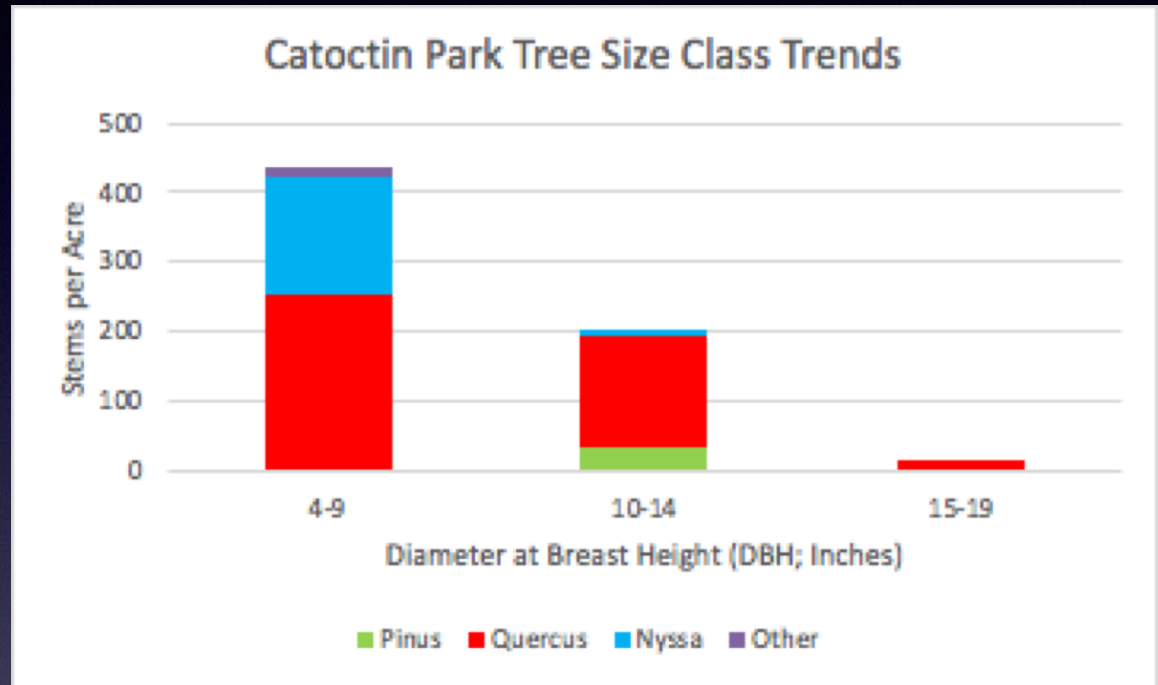


Figure: Danielle DiMarco



# Increase in Mesic Understory

- Loss or reduction in hard pine reproduction in the small size class
- Increase in black gum in the small size class
- Oaks are well represented in the small and medium size classes





# Major Conclusions

- Pre-European fire regime is not yet known (but very old trees in my collection may yet be found)
- Fire was frequent in the 19th & 1st half of the 20th centuries.
- Fire was suppressed by 1950's at Catoctin, 1970's-90's elsewhere to the west
- Most fires were in the Dormant Season (between annual growth rings)
- Vegetation Plots Indicate influx of Black Gum in the understory and a reduction of pines in small size classes.



# Acknowledgements

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Thank you!