

Fire Exclusion: Destroying Forests For Over a Century – A Look At The Metolius Research Natural Area

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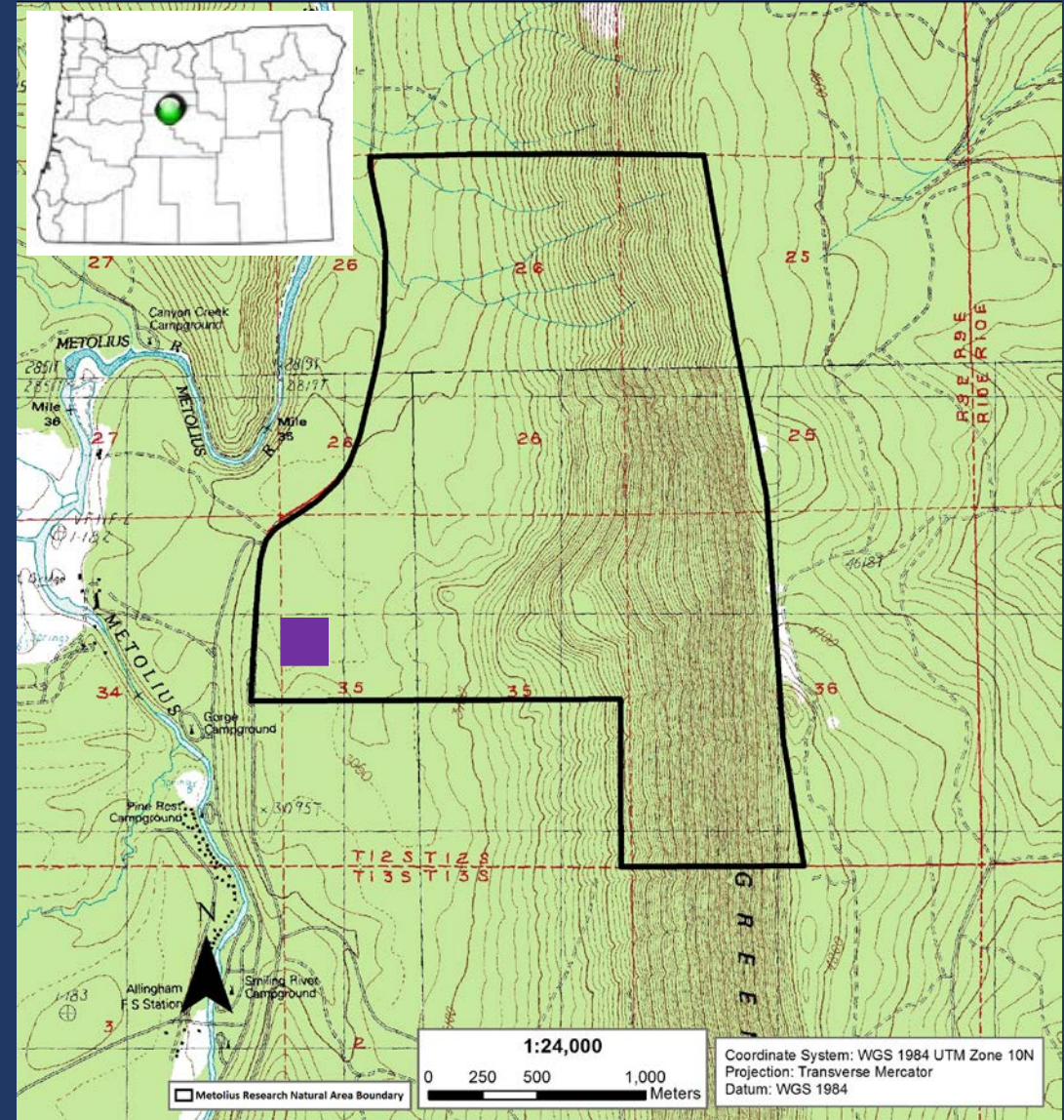
Oregon State University

Central Oregon Fire

- Central Oregon historically had frequent, large fires
- Late 1800s/Early 1900s began very successful fire suppression tactics
- Fire exclusion has been negatively impacting forest's structure & function across the west
 - Dense structure
 - Composition shifts
 - Reduced vigor of large trees
 - Increased fuel loading
 - Extreme fires & fire effects

Metolius Research Natural Area

- 18 miles NW of Sisters, Oregon
- Established in 1931, fire exclusion has been the only land use change
- Ponderosa pine & mixed-conifer are fire dependent ecosystems
- 1343 acres total, plot PPGY 11 acres



Metolius Research Natural Area

- Primary objective is to support a **high-quality example of ponderosa pine** and mixed-conifer forest managed in a way that allows **natural processes to predominate**, with minimal human intervention
- Fire is a critical natural process
- Fire exclusion violates the management plan
 - Do we see repercussions of fire exclusion in the Metolius RNA?

Research Questions

1. What did the stand look like historically? What does it look like now?
 - Stand density
 - Stand structure
 - Ingrowth & mortality rates
 - Spatial patterns
2. What would a fire in August do?
3. What's the fire history?

Why it's Important

- High-quality stand conditions & intact natural processes are the primary objectives of the RNA
- A wildfire could potentially cause us to lose this resource
- Historical stand conditions are important to consider when managing with unpredictable future conditions (climate change, insect & disease, fire)

Methods: Transects



Methods: Tree Coring

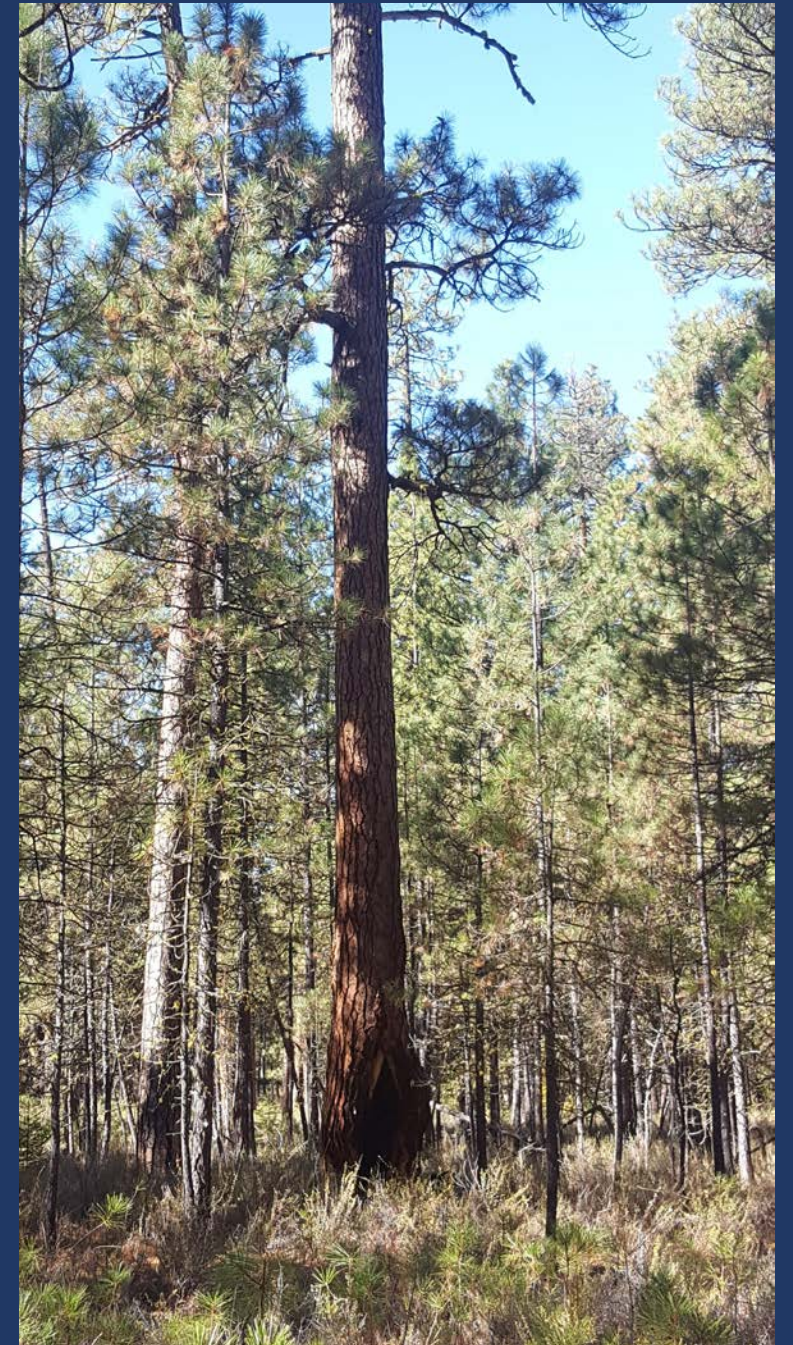


Methods: Fire Scars

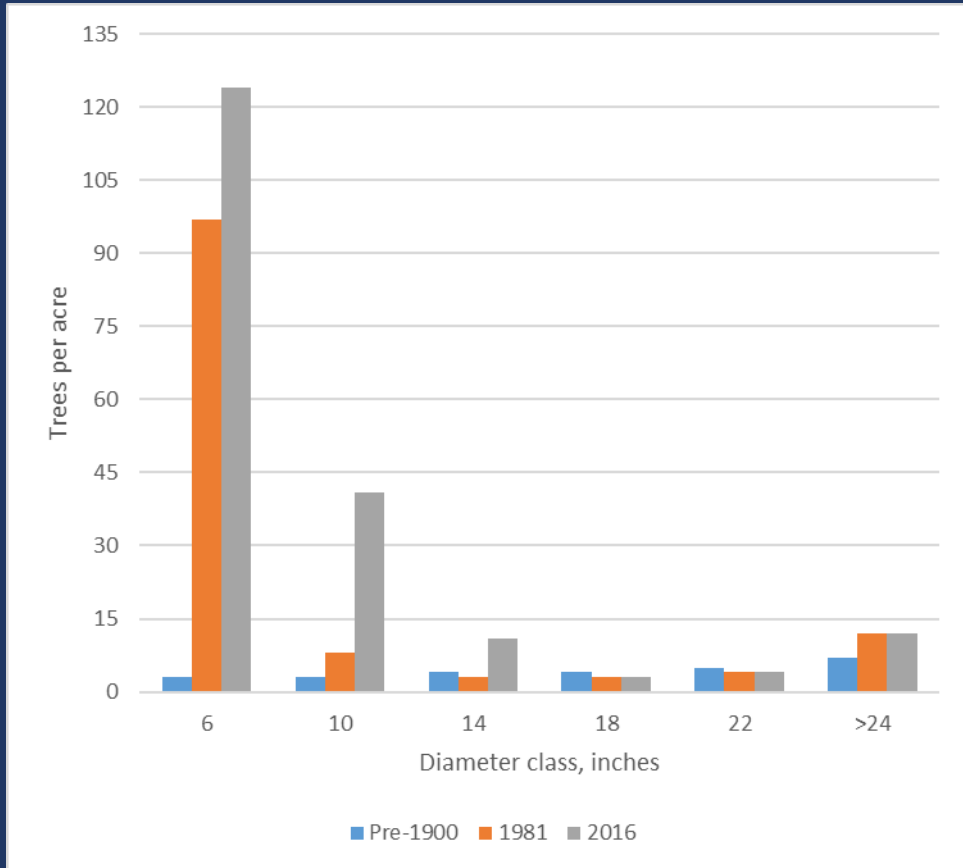


Results: Stand Density

Diameter Class (inches)	Historical TPA	1981 TPA	2016 TPA
Seedlings	---	---	1383
Saplings	---	---	39
Poles	---	---	38
6	2-8	97	124
10	2-8	8	41
14	3-6	3	11
18	3-5	3	3
22	4-7	4	4
>24	6-16	12	12
Total >4	20-50	127	195



Results: Stand Structure



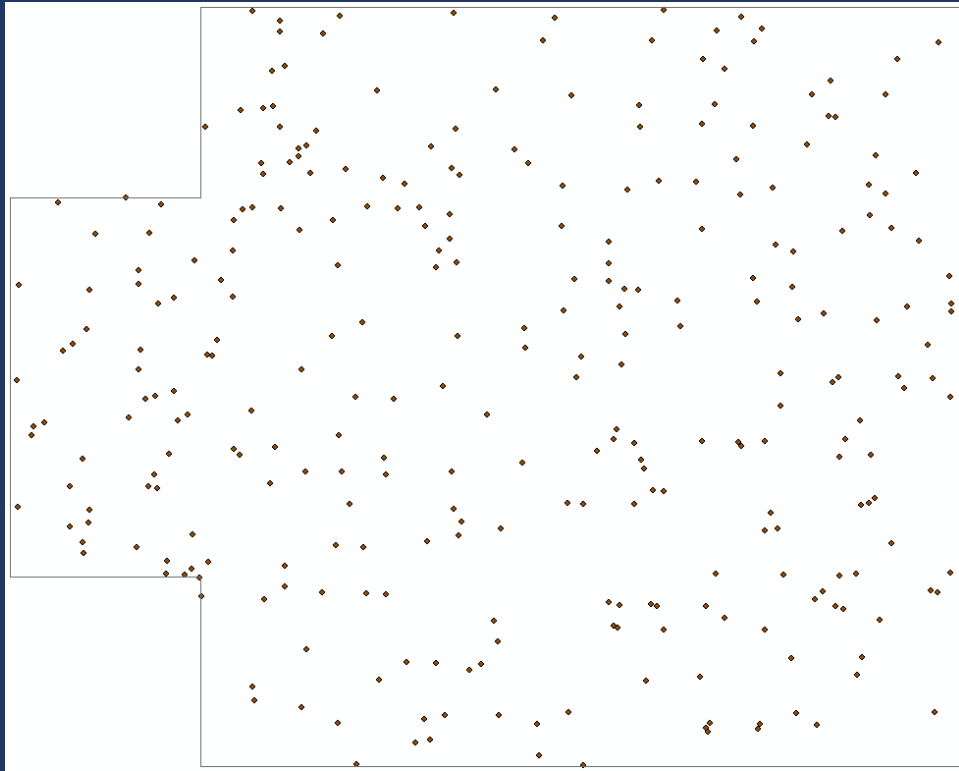
Results: Ingrowth & mortality rates (1981-2016)

- Every 5 years:
 - 13 TPA ingrowth
 - 4 TPA die
- 1981-2016:
 - 27 trees (2.43 TPA) grew into the large diameter size class
 - 29 large diameter trees (2.61 TPA) died
 - 1072 trees (96 TPA) grew into the stand (>4 in)
 - 234 small trees (21 TPA) died (<6 in)

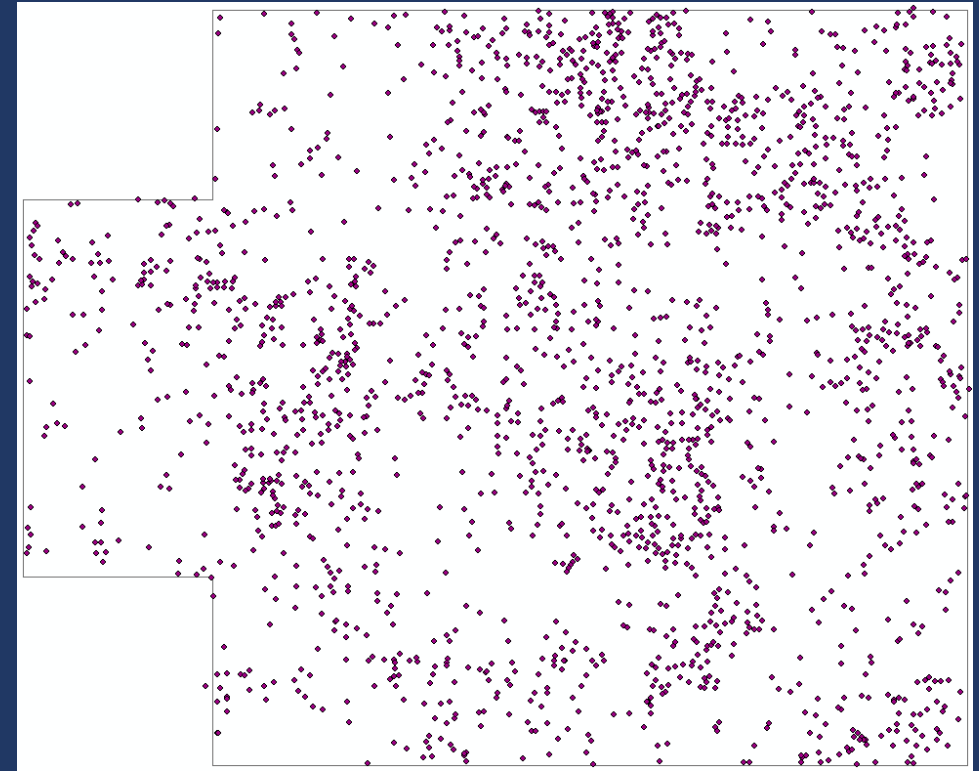


Results: Spatial patterns...

Pre-1900



2006



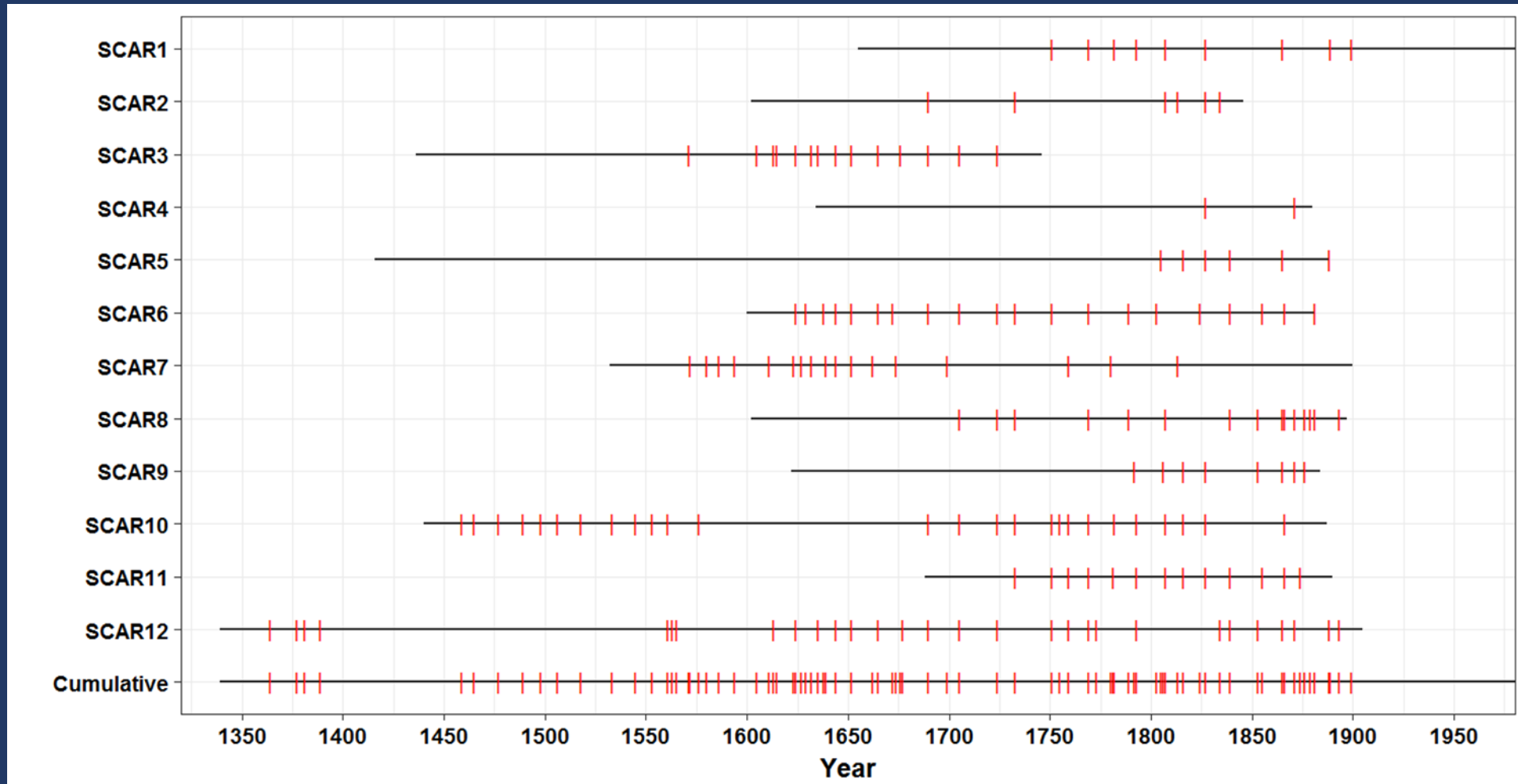
Results: August Fire

Weather	Rate of spread (ch/hr)	Flame length (ft)	Mortality
Mild	2.3 – 12.9	1.6 – 3.6	6%
Average	5.6 – 38.4	2.6 – 6.2	6%
Extreme	24.9 – 151.1	5.7 – 13.2	55%



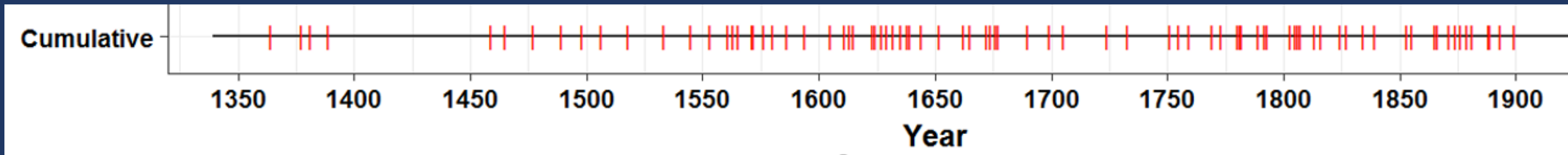
Results: Fire History

Fire returned every 6 years, min = 1, max = 19



Results: Fire History

Fire returned every 6 years



Take Home Points

- The stand is considerably different from what it was like before fire exclusion
- This and the fire exclusion itself are in violation of the RNA's primary objectives
- If it is desired to restore to historical conditions and reinitiate natural processes, management suggestions include:
 - Thinning, primarily in size classes pole through 12 inches – size classes most different from historical conditions and less likely to be killed by fire alone
 - Reintroduce frequent fire, attempt to replicate historical range of variability – not just average fire return interval

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Thank you for your time

