

A synthesis of historical fire regimes in the southwestern United States



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Mesoscale Disturbance and Ecological Response to Decadal Climatic Variability in the American Southwest

THOMAS W. SWETNAM

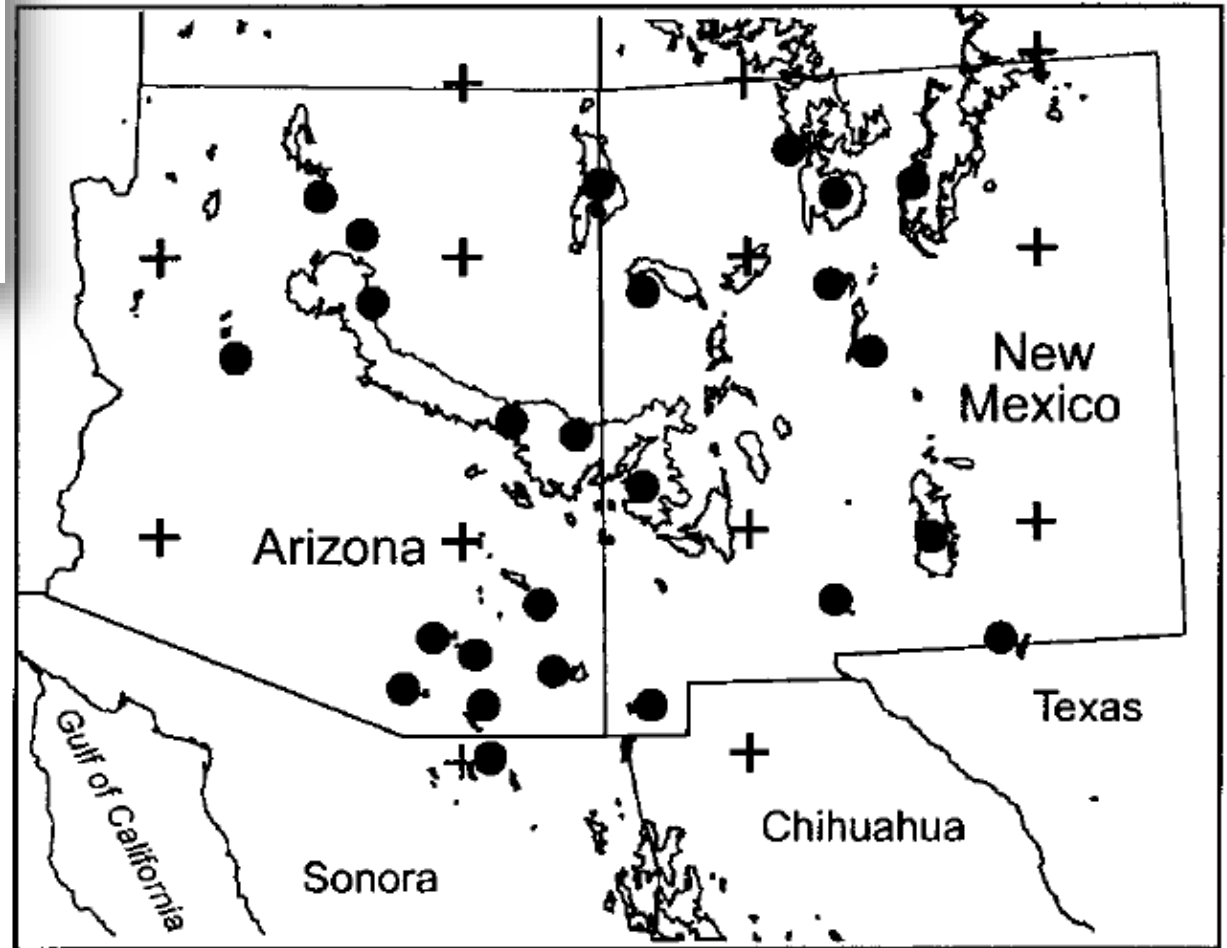
Laboratory of Tree-Ring Research, The University of Arizona, Tucson, Arizona

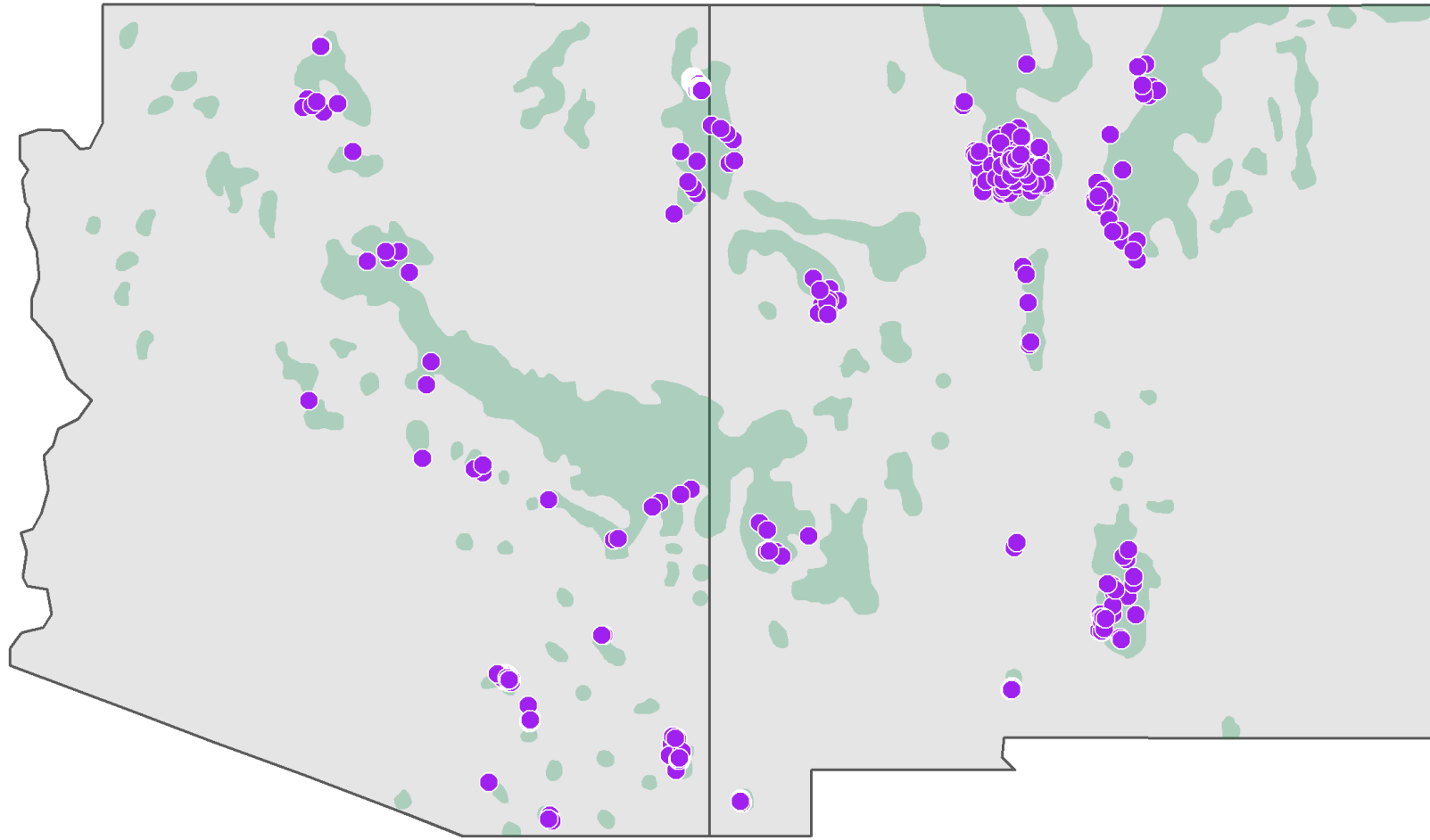
JULIO L. BETANCOURT

Desert Laboratory, U.S. Geological Survey, Tucson, Arizona

(Manuscript received 14 January 1997, in final form 31 July 1997)

63 sites →





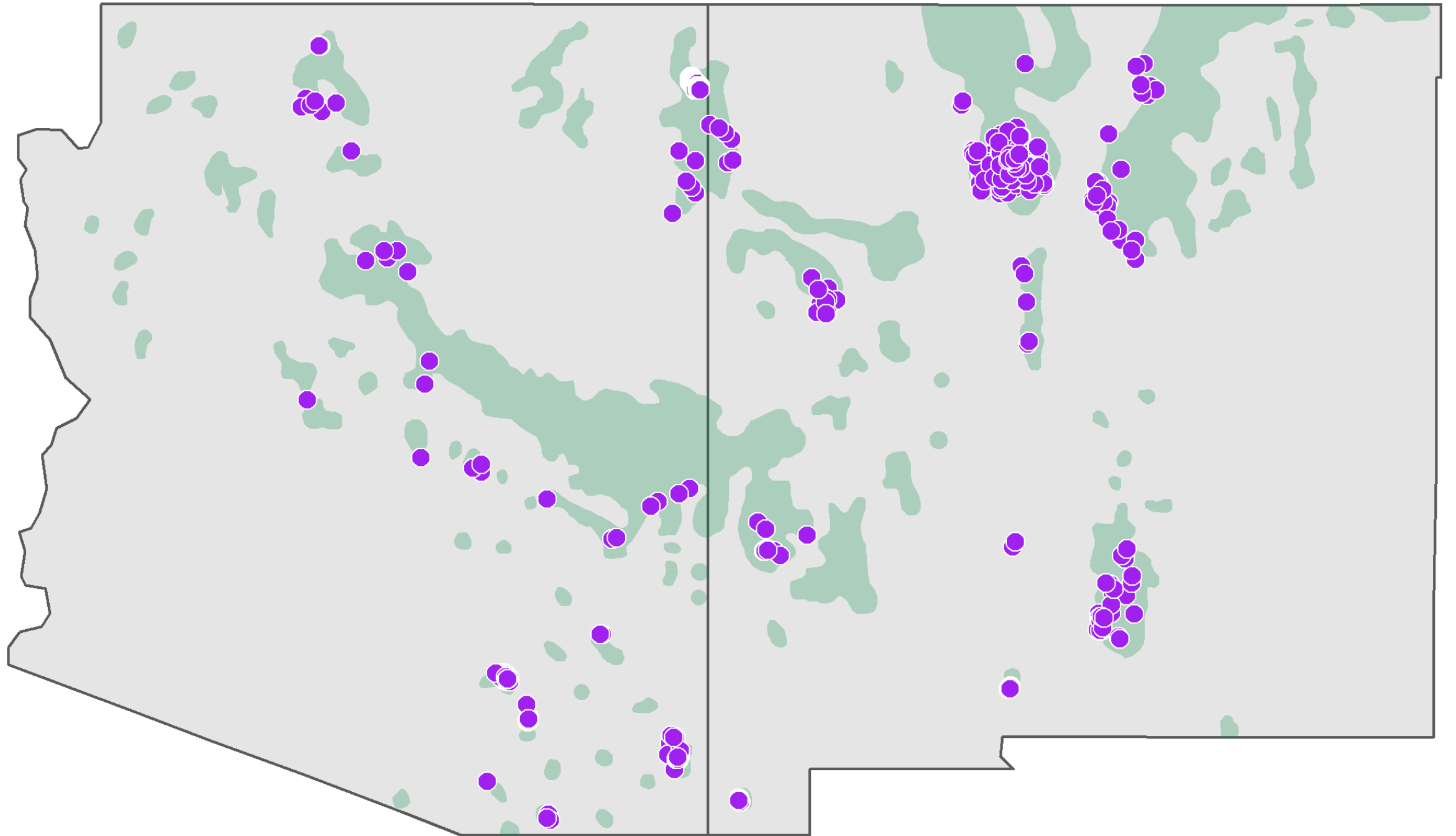
Data sources:

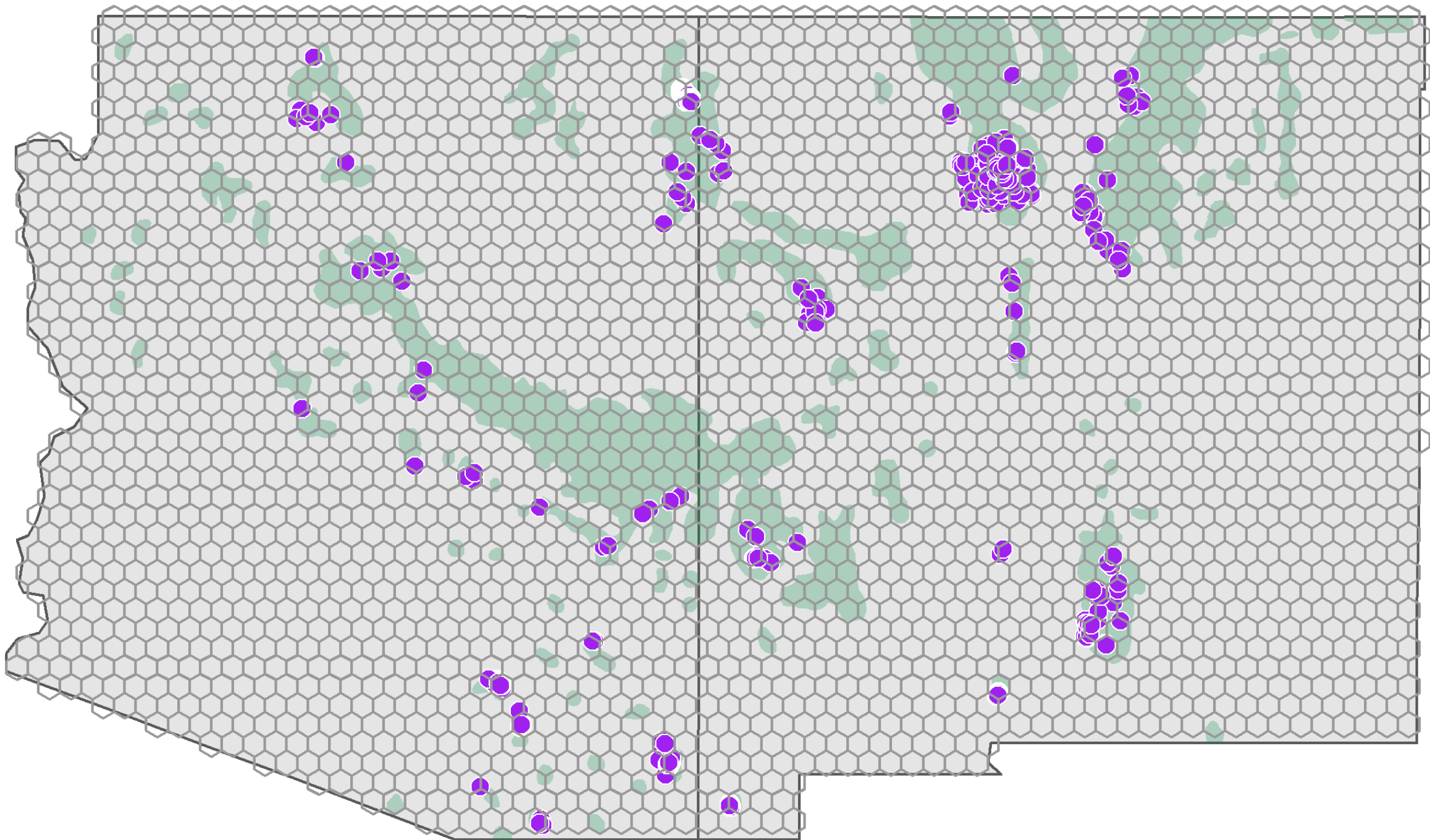
- International multiproxy paleofire database (IMPD)
- Fire and Climate Synthesis Project (FACS)
- New contributions

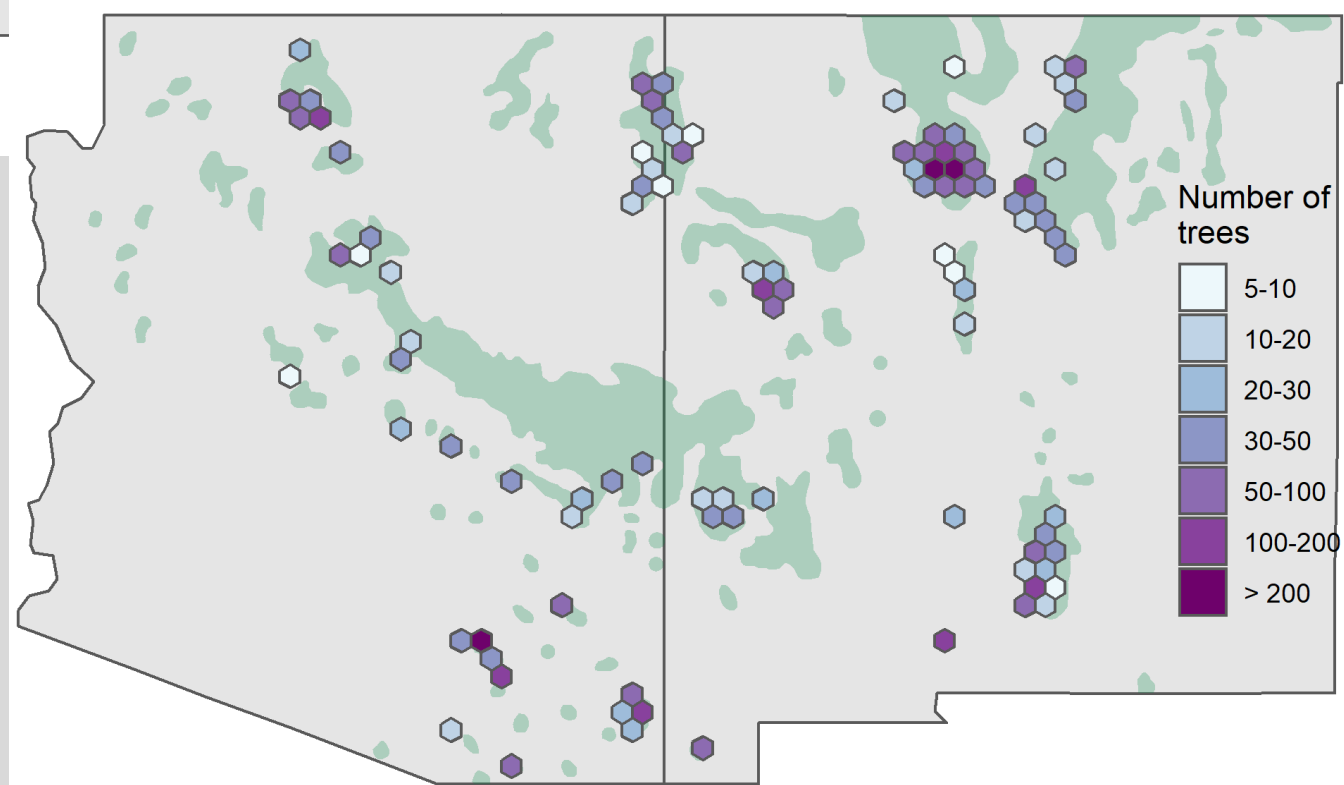
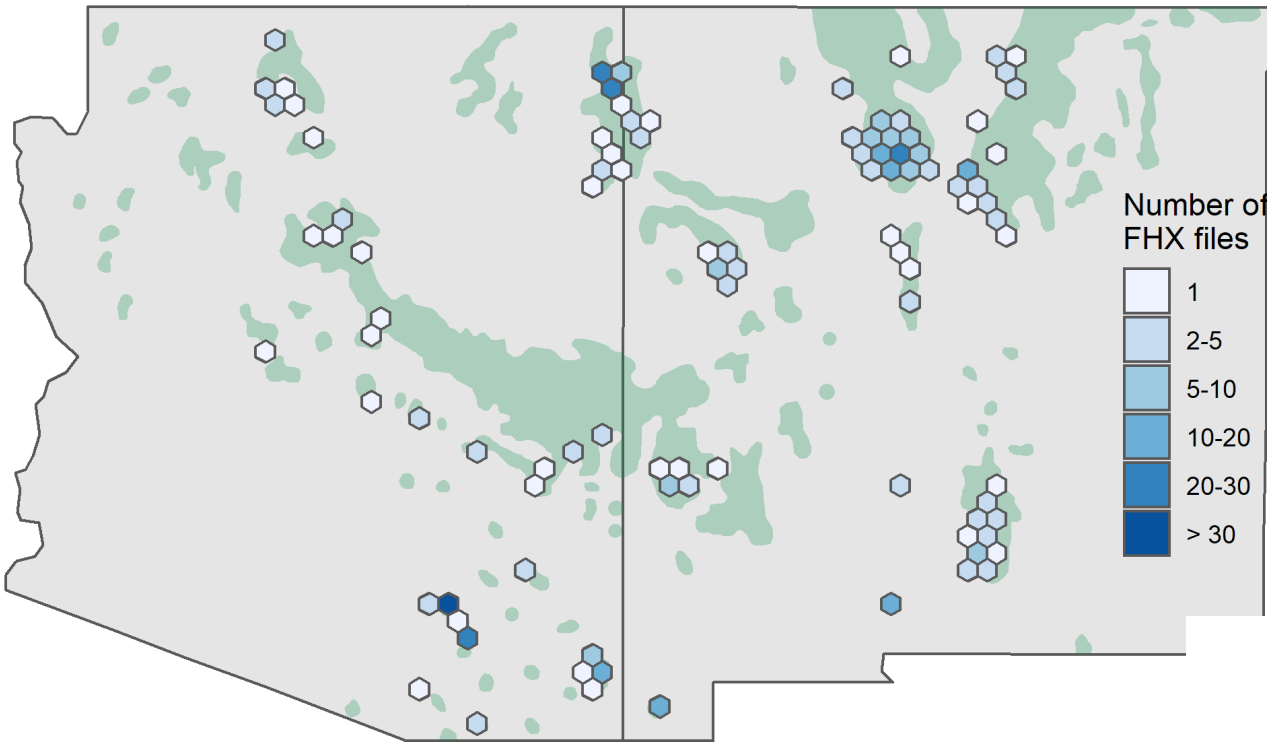
• 414 sites • 5,039 trees • 37,220 fire scars

Objectives

- Quantify the spatiotemporal variability of regional fire-scar records:
Pyrodiversity
 - Seasonality
 - Fire frequency and change
 - Interannual fire-climate relationships
- Elucidate the strength of climate in driving fire regime metrics
- Identify and understand human-fire interactions









LATEWOOD SCAR



LATE EARLYWOOD SCAR



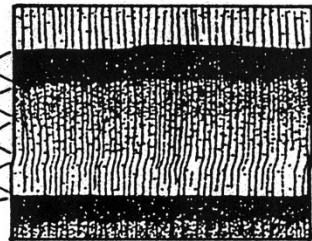
MIDDLE EARLYWOOD SCAR



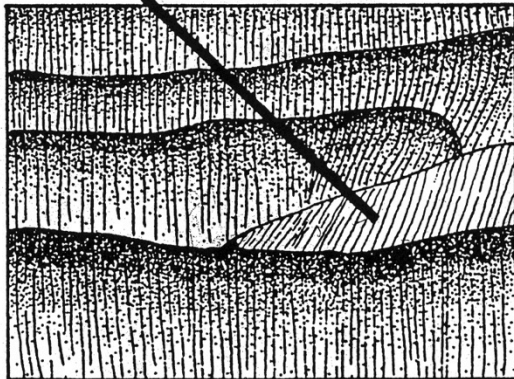
EARLY EARLYWOOD SCAR



FIRE SCARS



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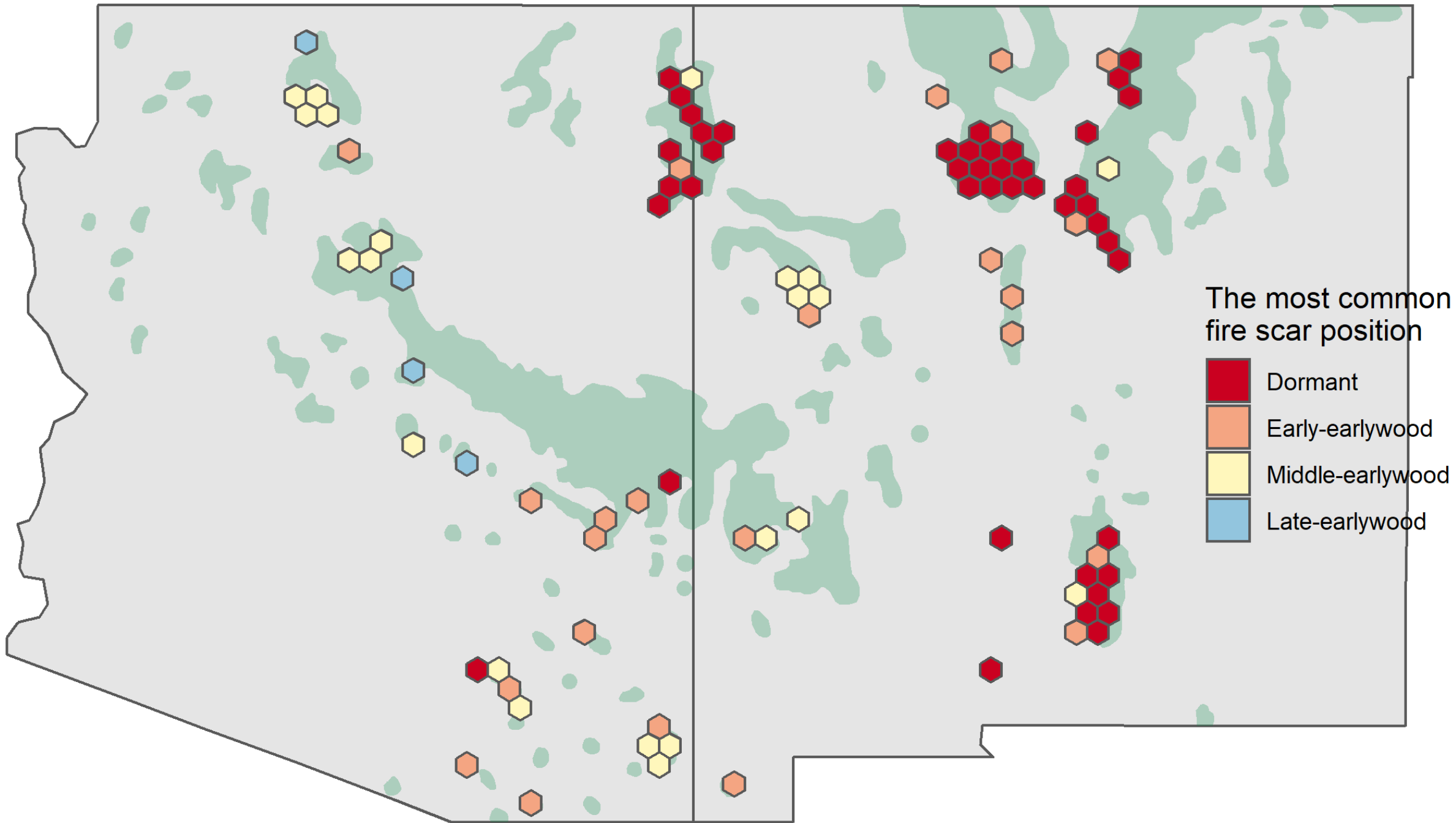


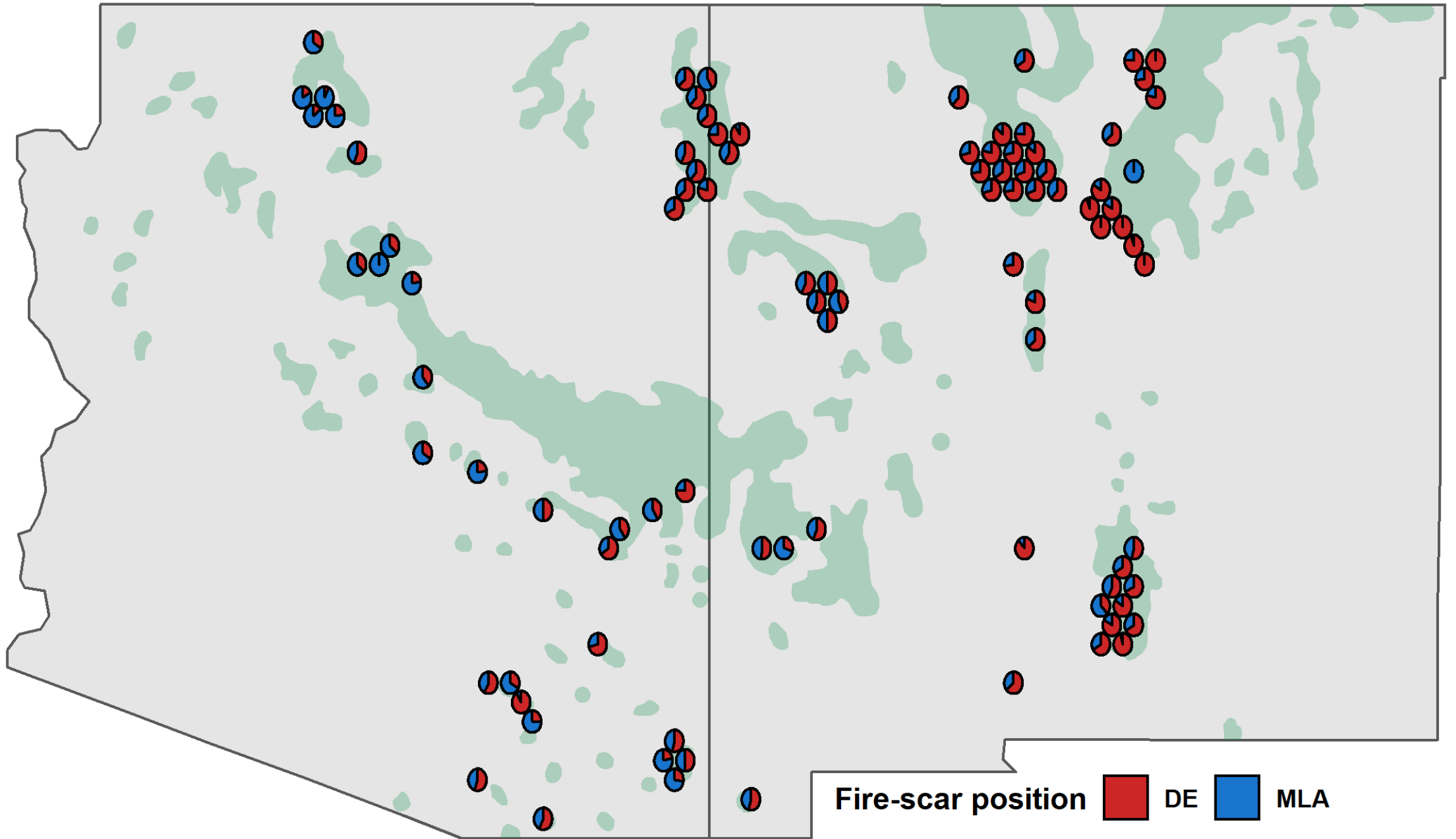
DORMANT PERIOD SCAR



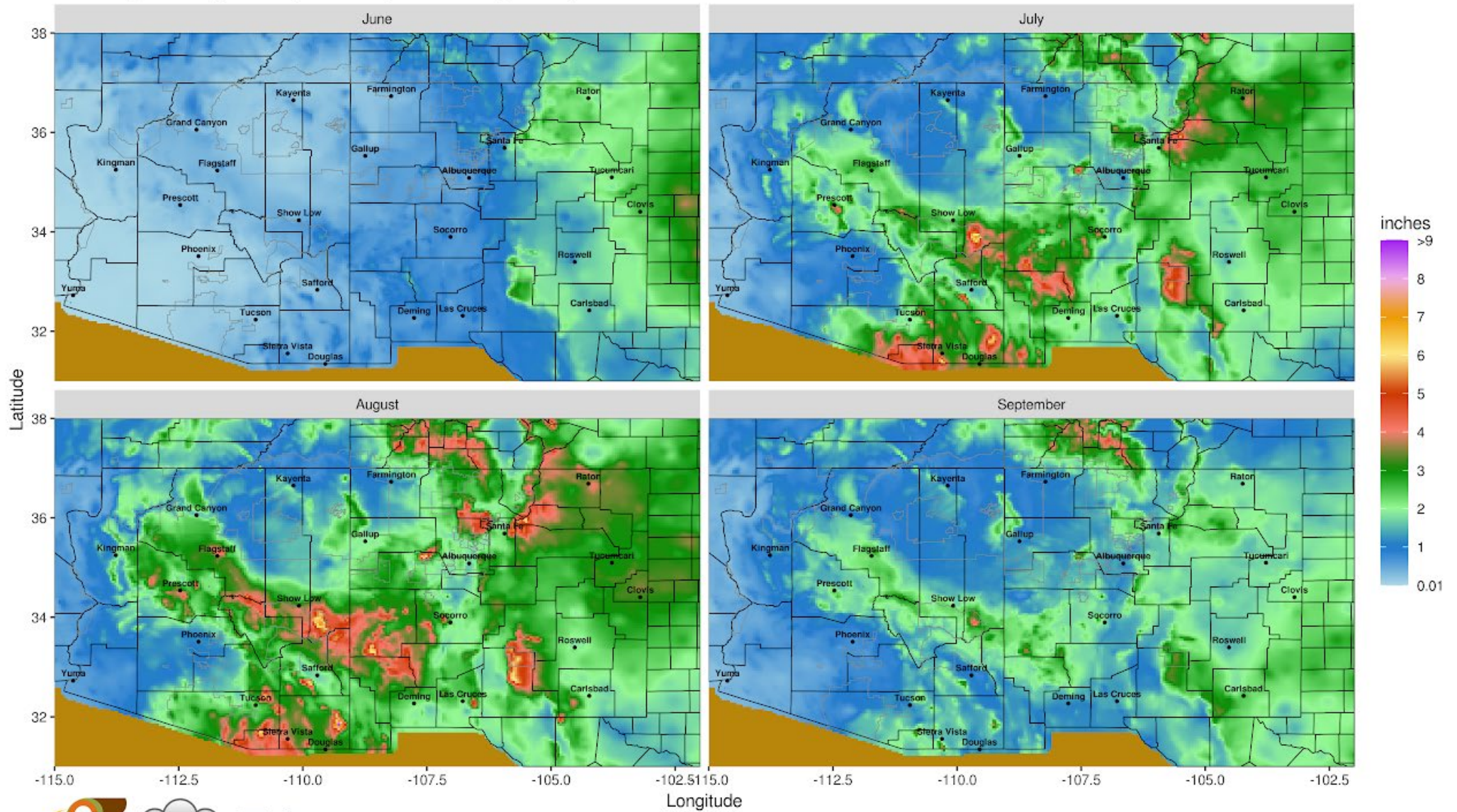
Late earlywood

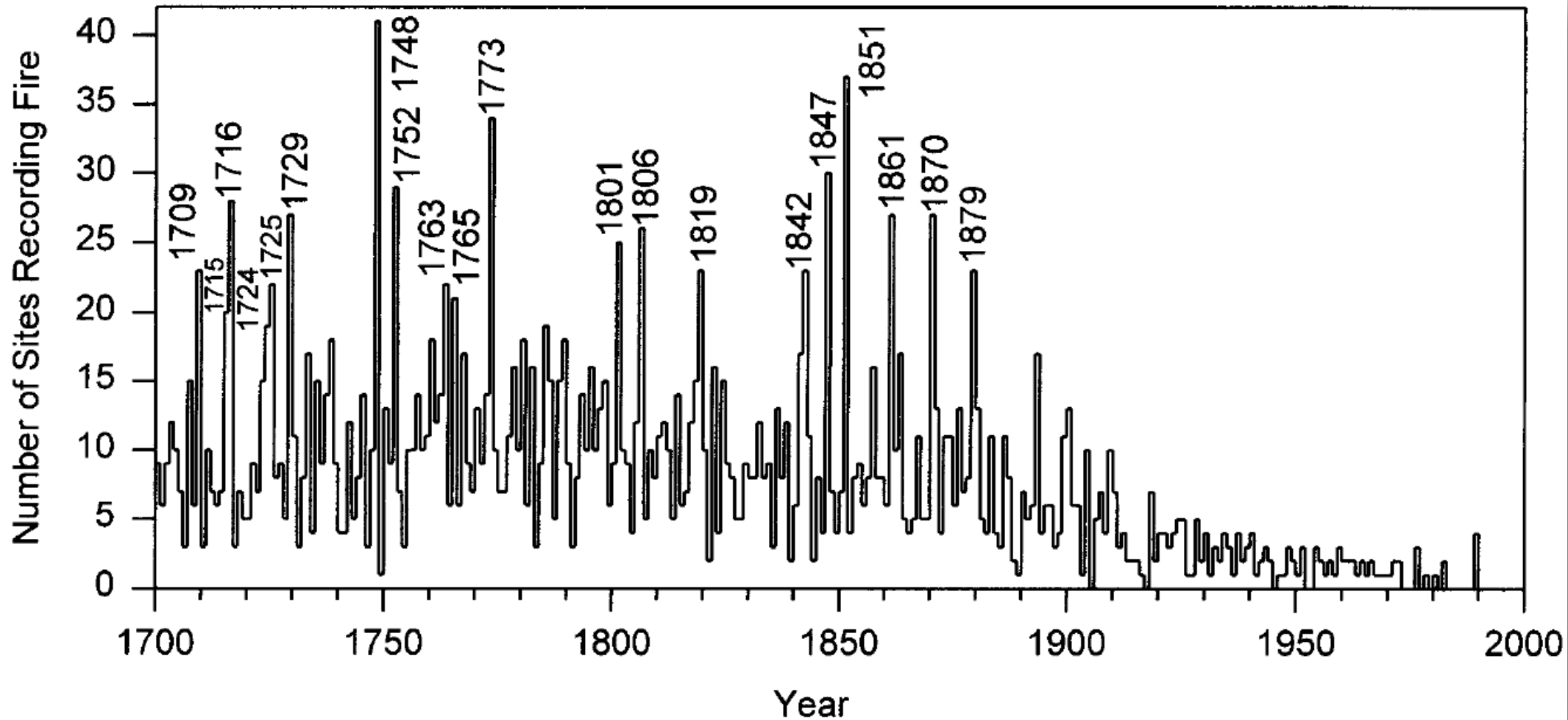
Dormant





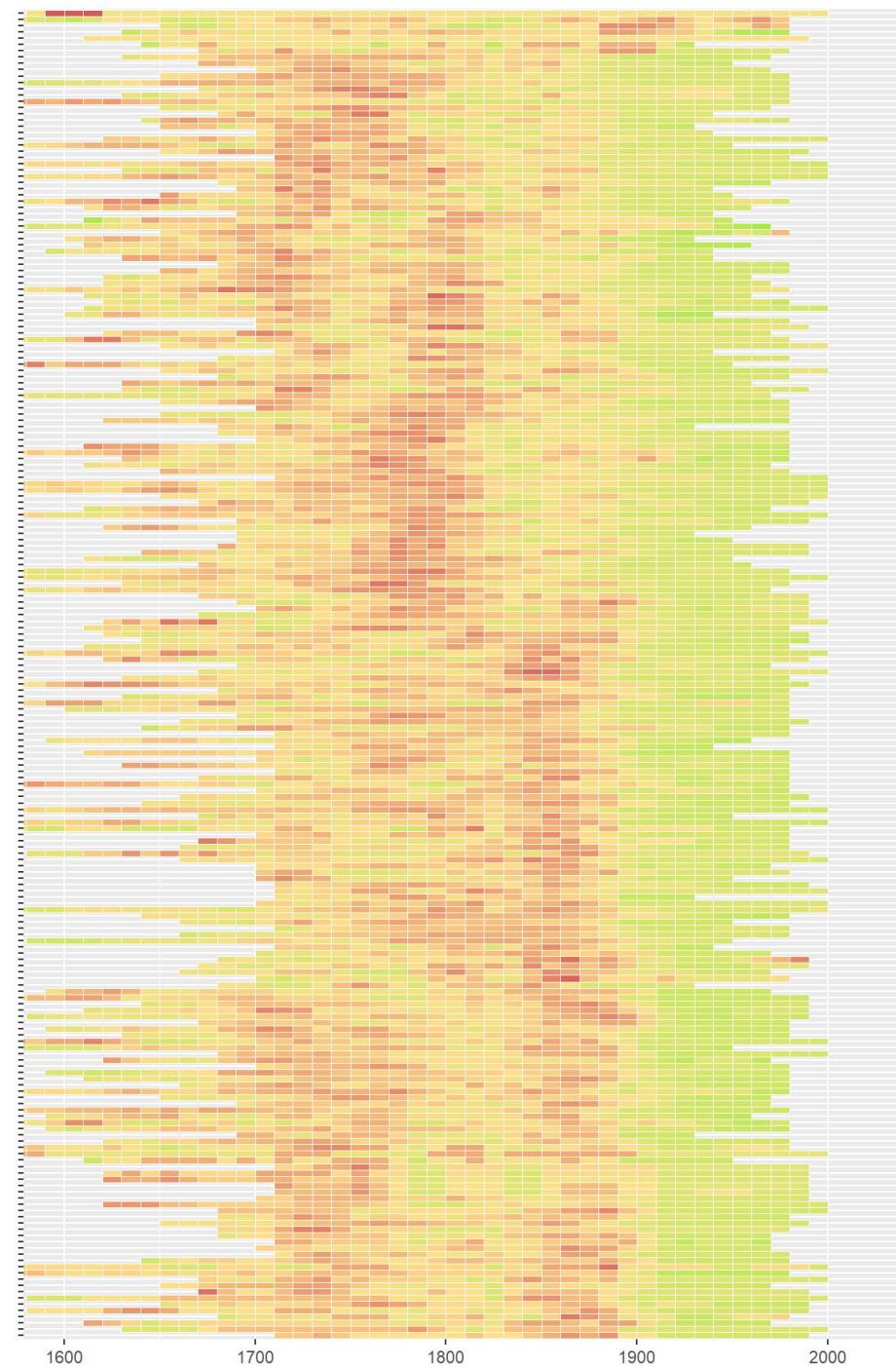
Monthly Average Precipitation (1981-2010 period)

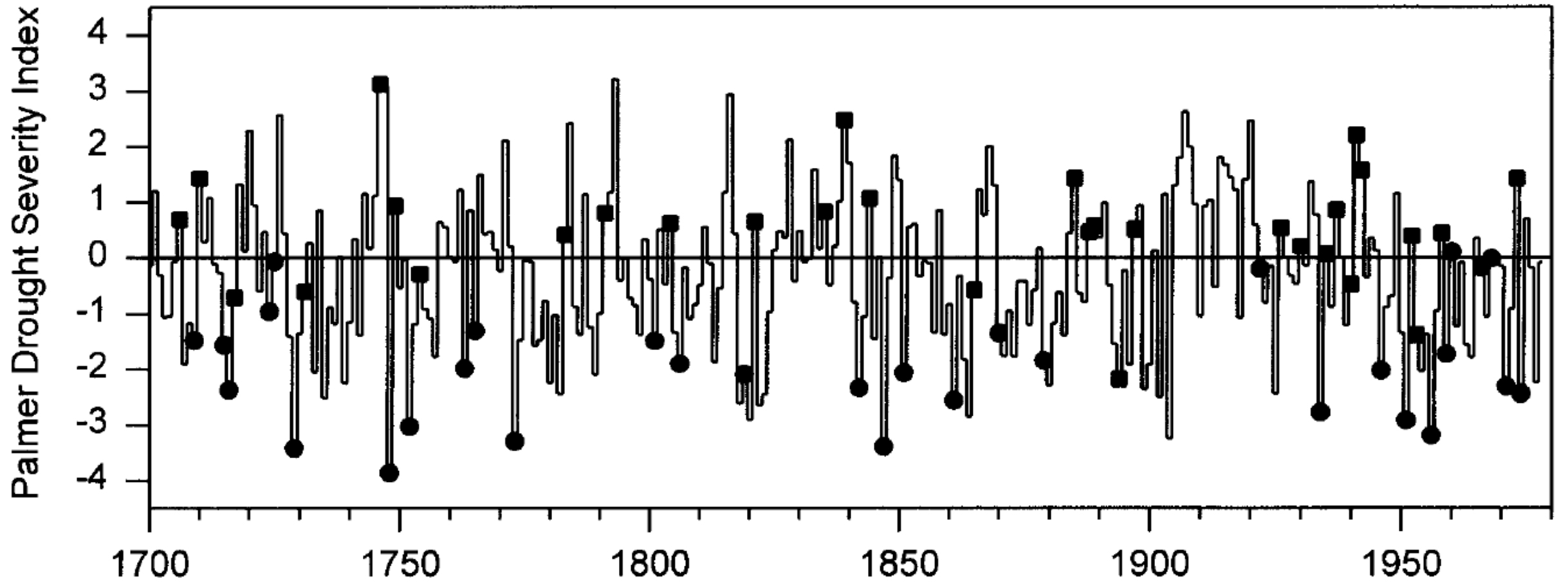




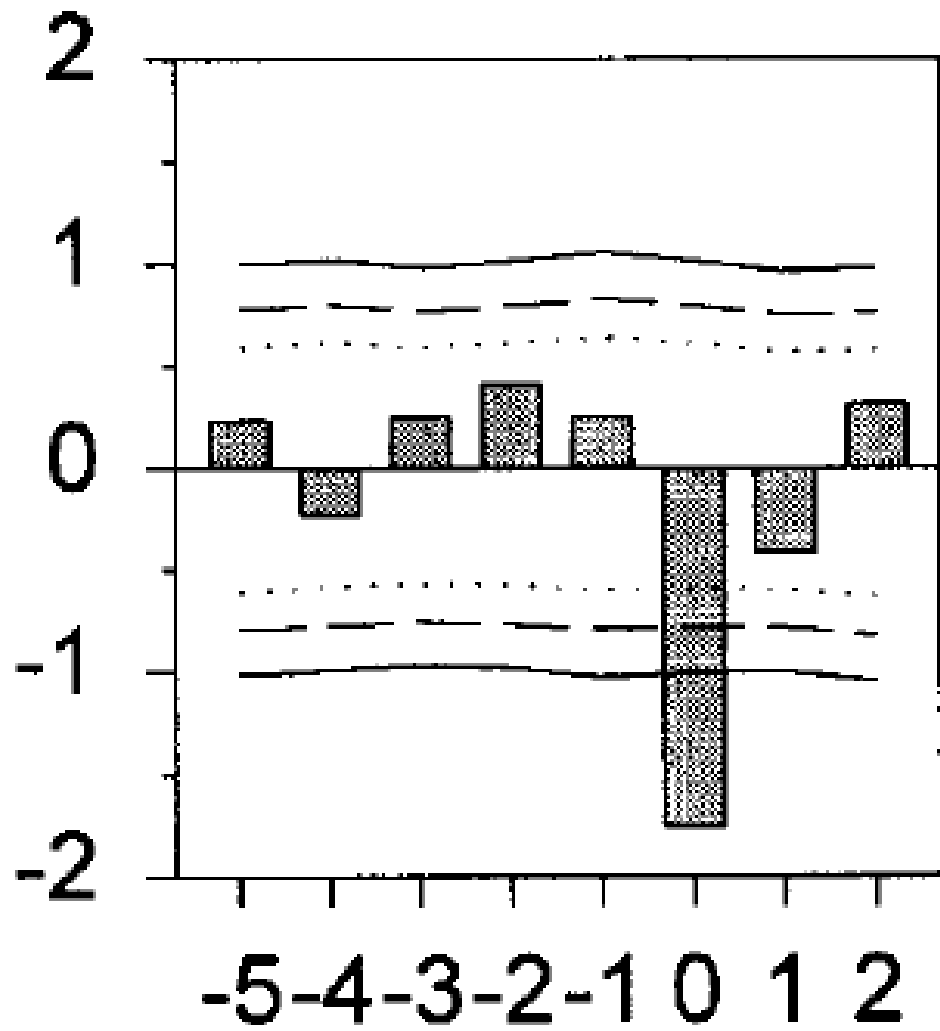
Multi-decadal fire frequency

- Individual sites > 300 years
- Sorted based on clustering of overall pattern



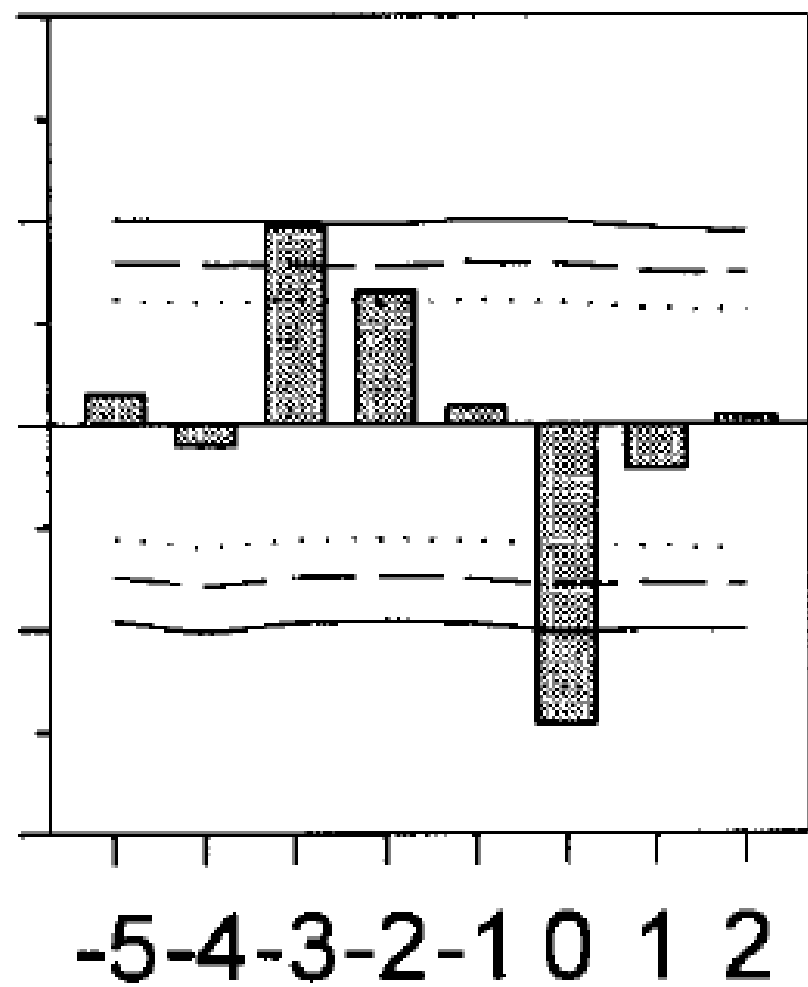


Mixed Conifer

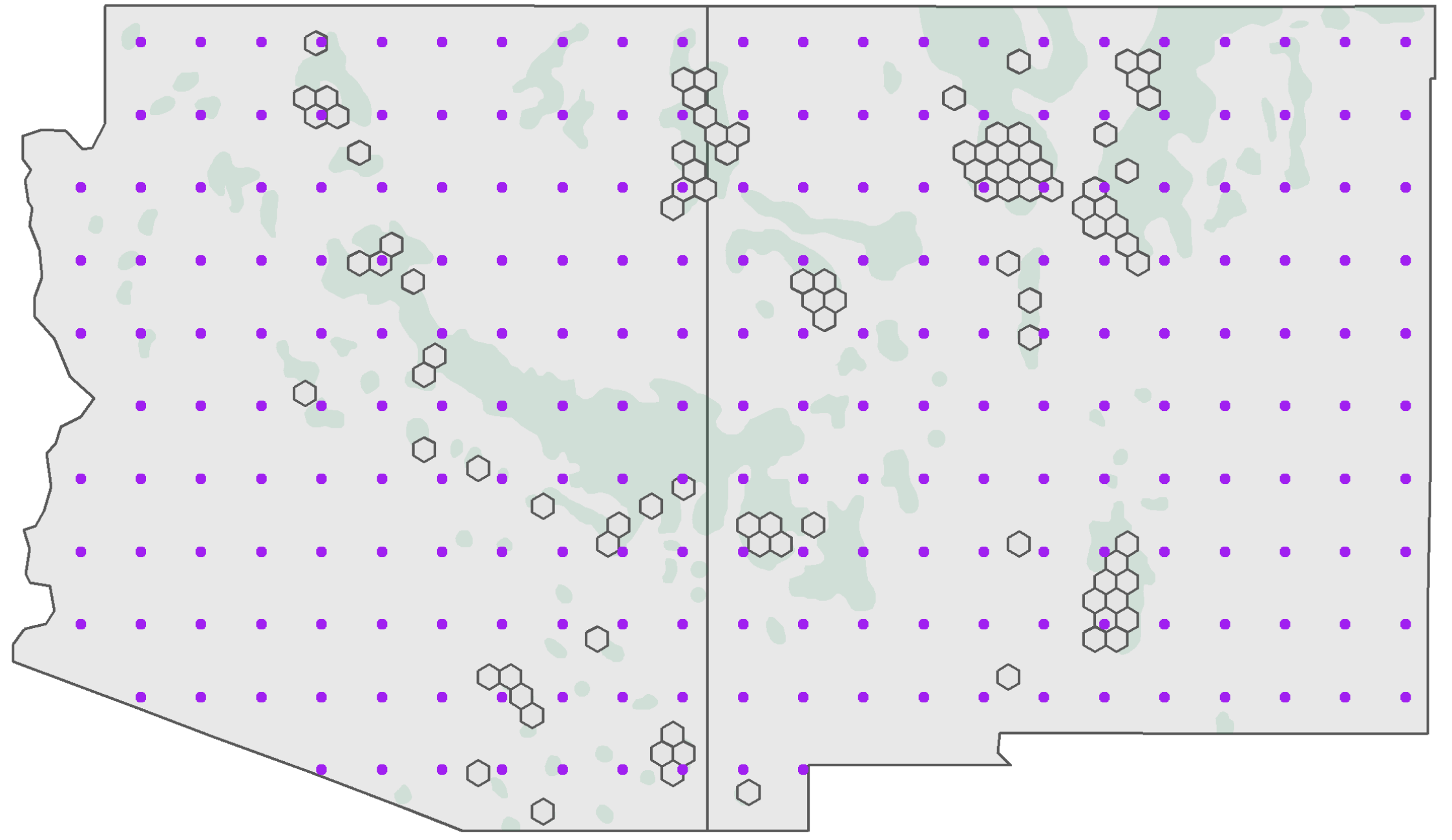


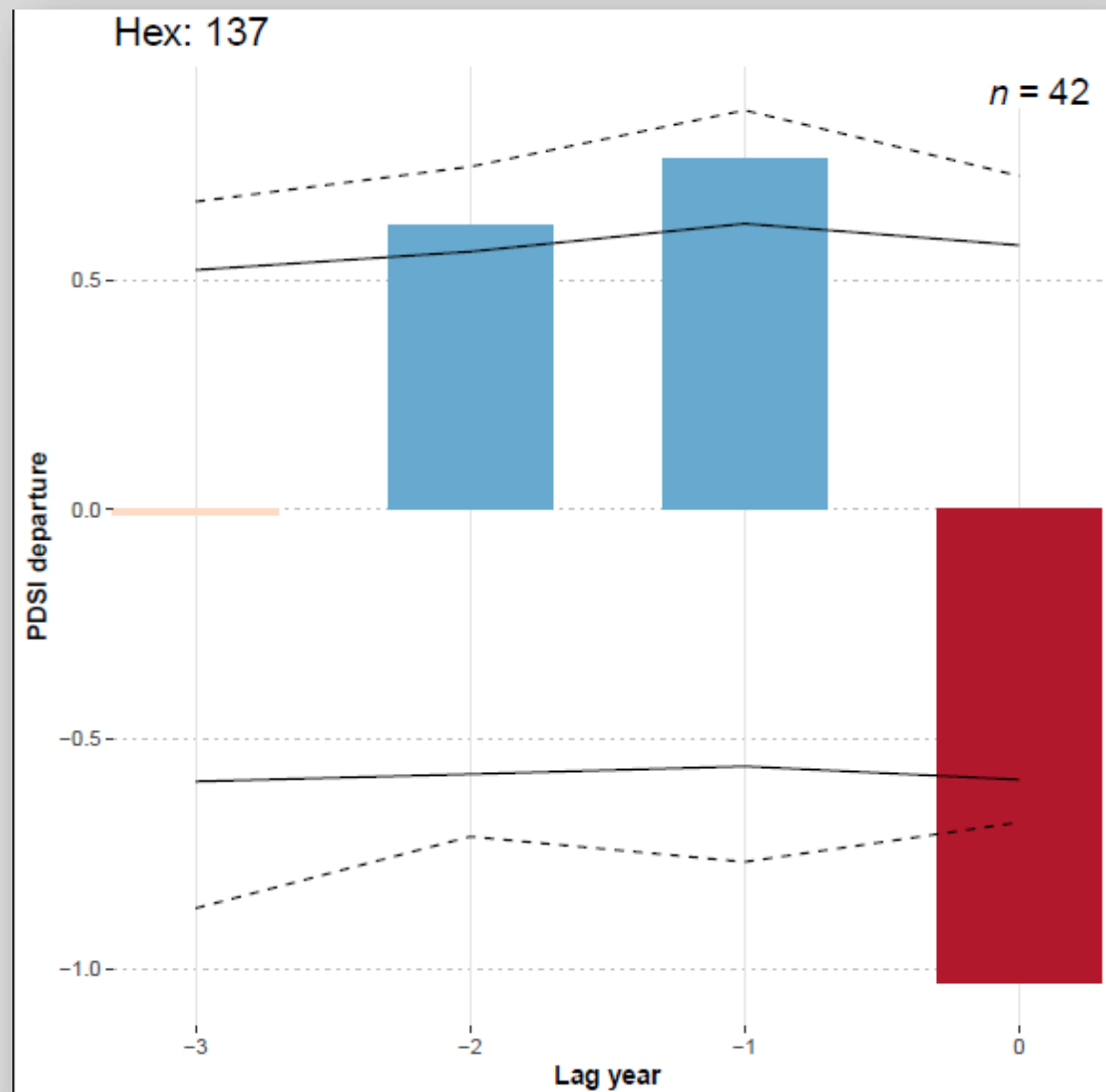
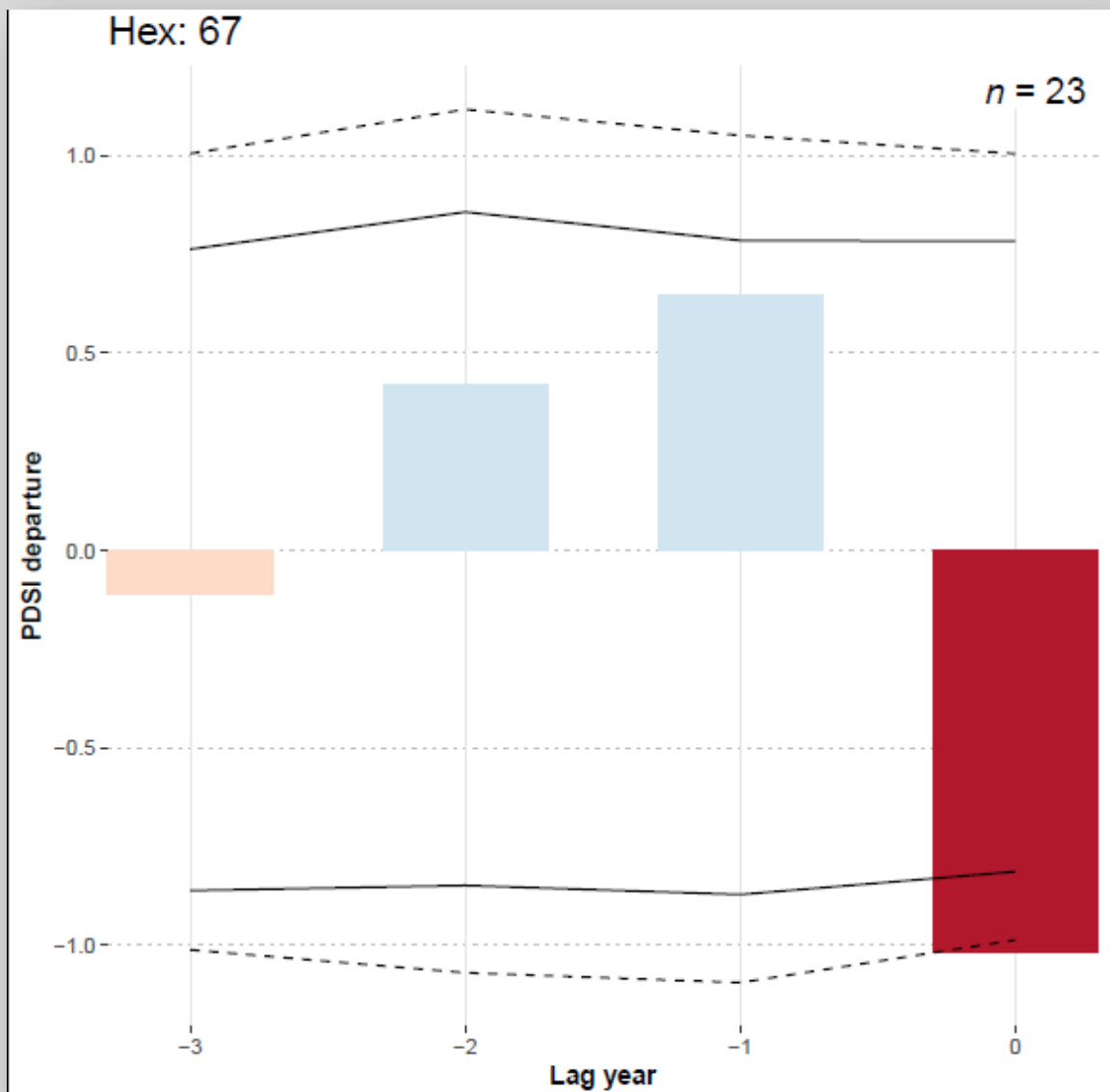
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Fire Year

Ponderosa Pine

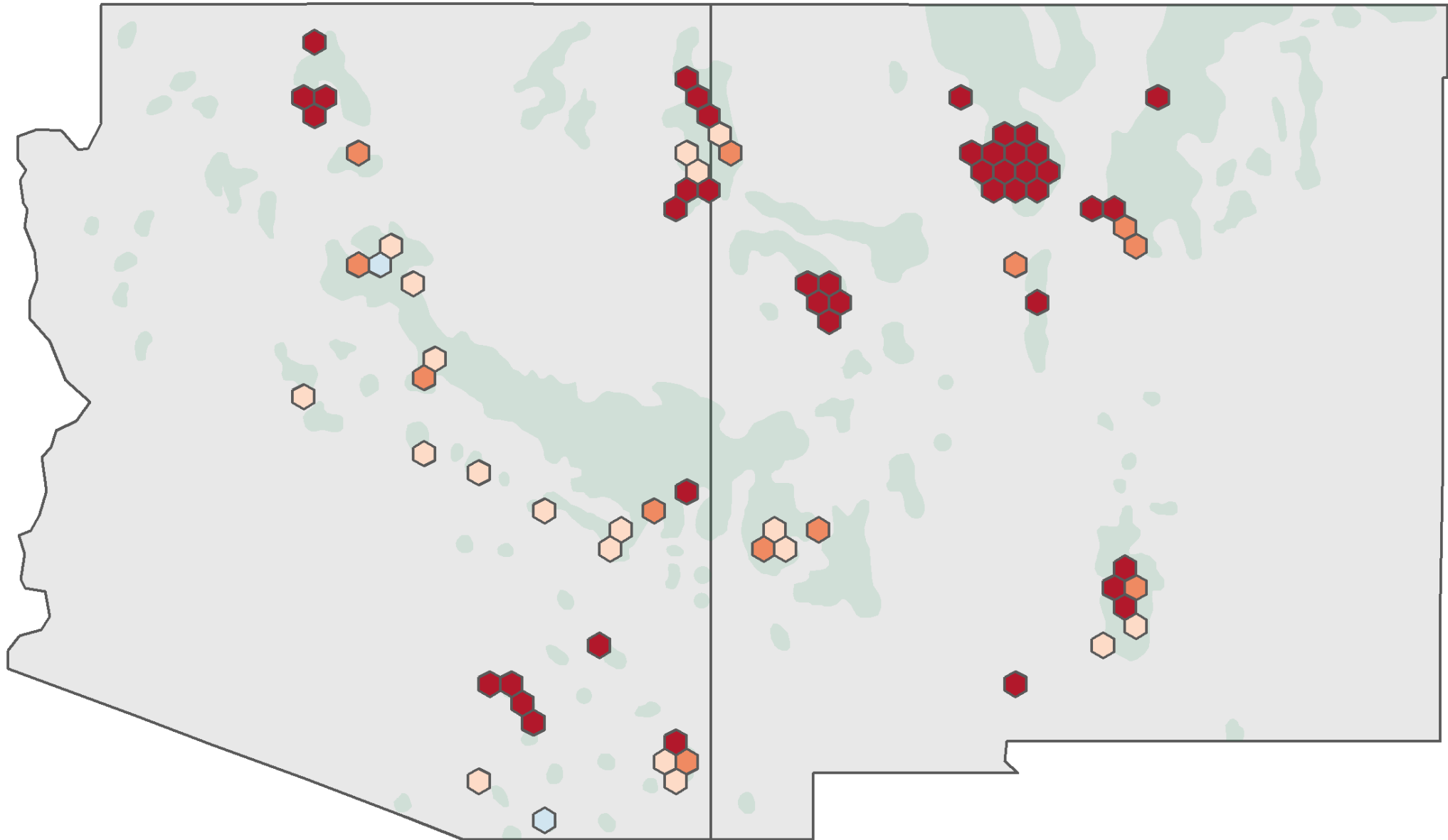


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Fire Year



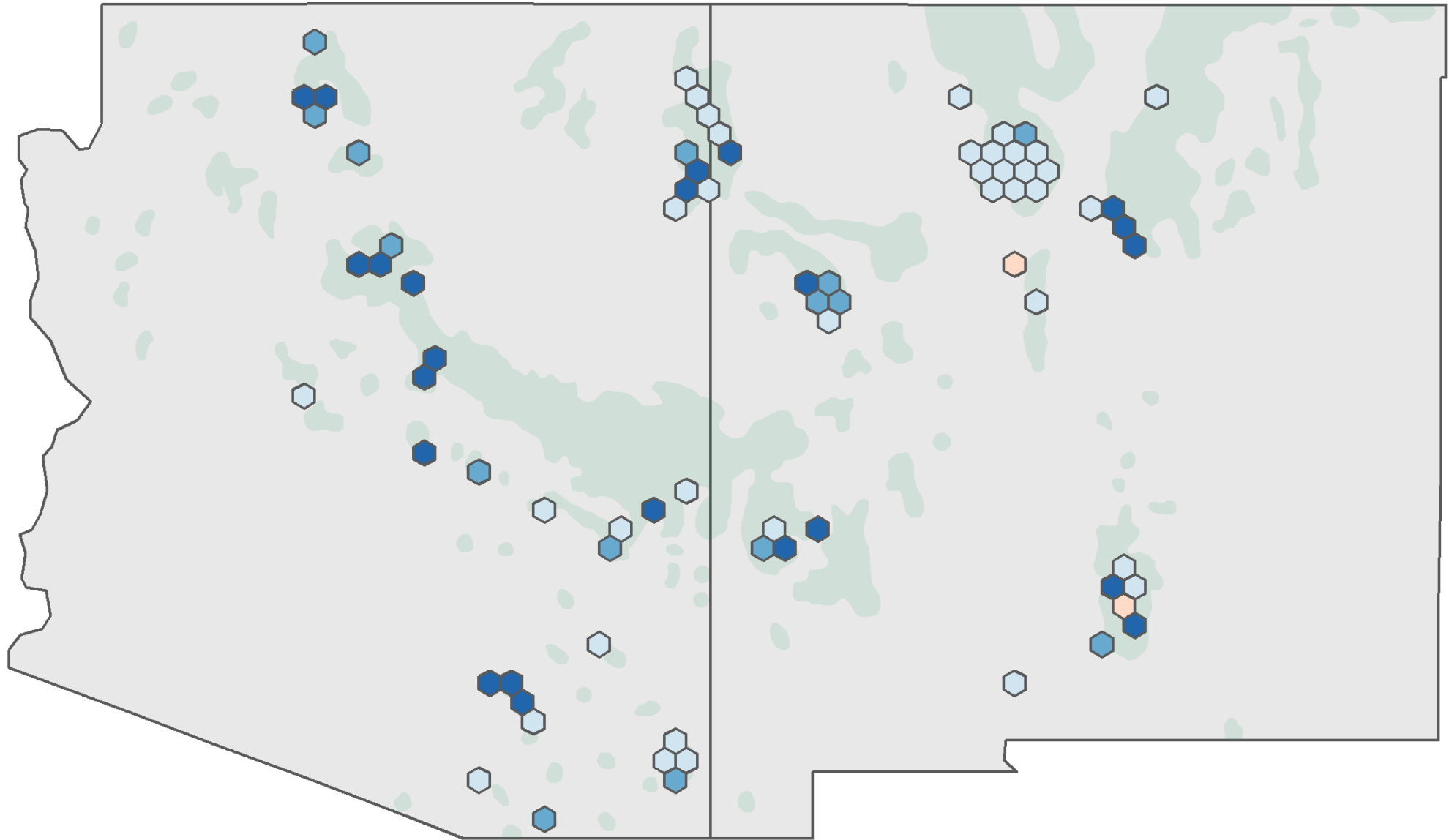


Year of fire



PDSI ■ wet ■ dry ■ < 95% ■ < 99%

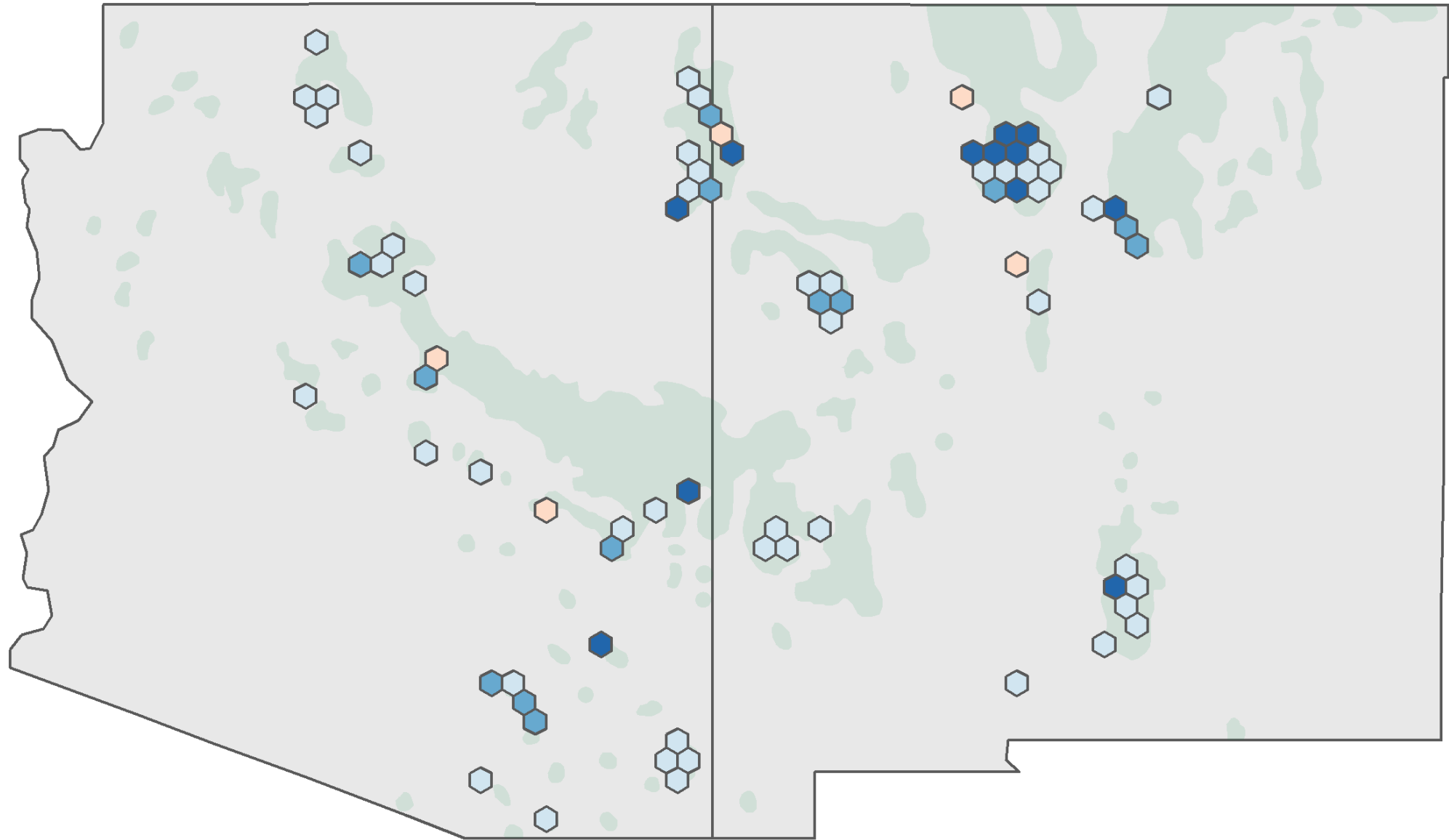
1 year prior to fire



PDSI departure

■	> 99%	■	> 95%	■	wet	■	dry
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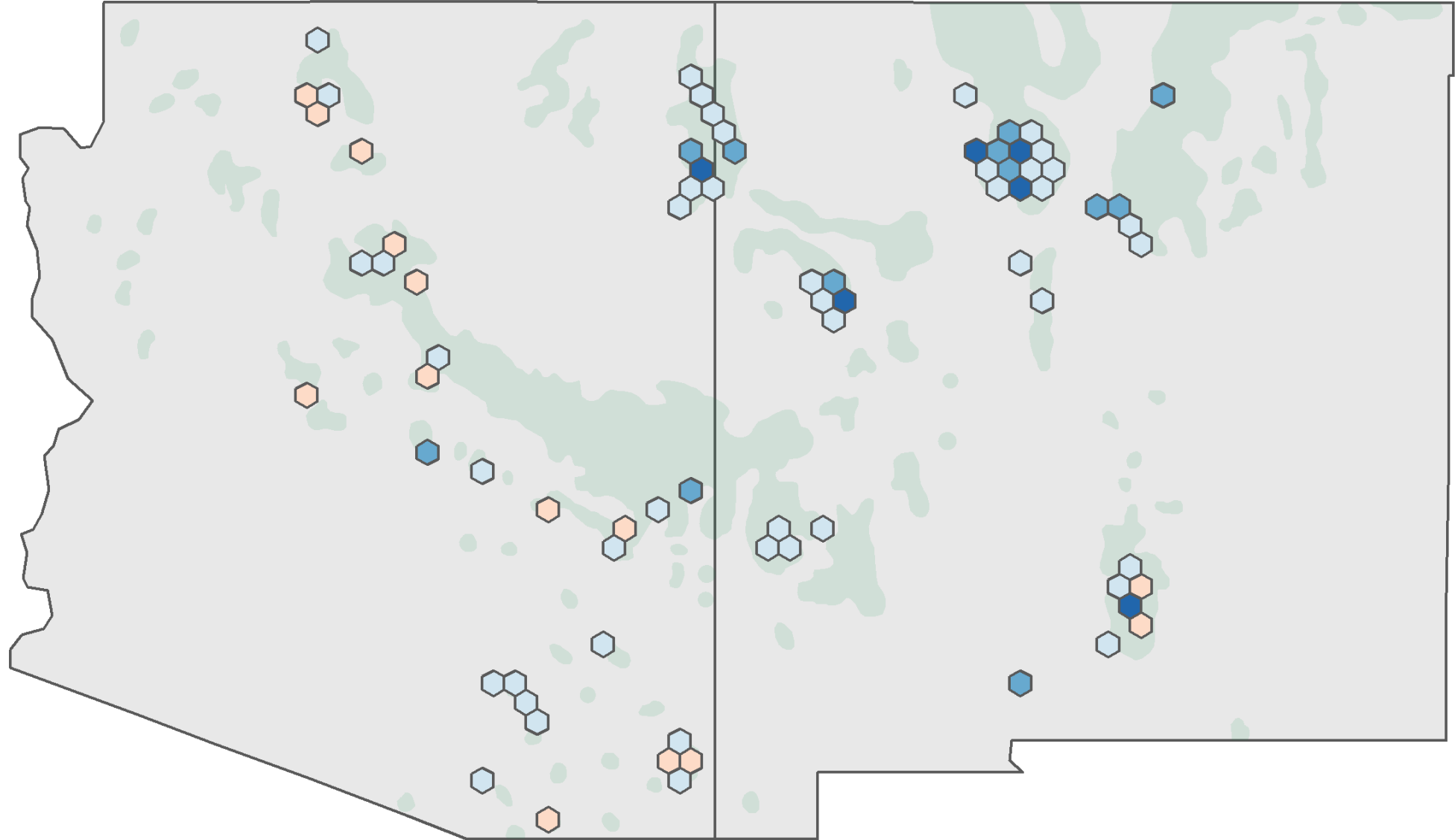
2 years prior to fire



PDSI departure

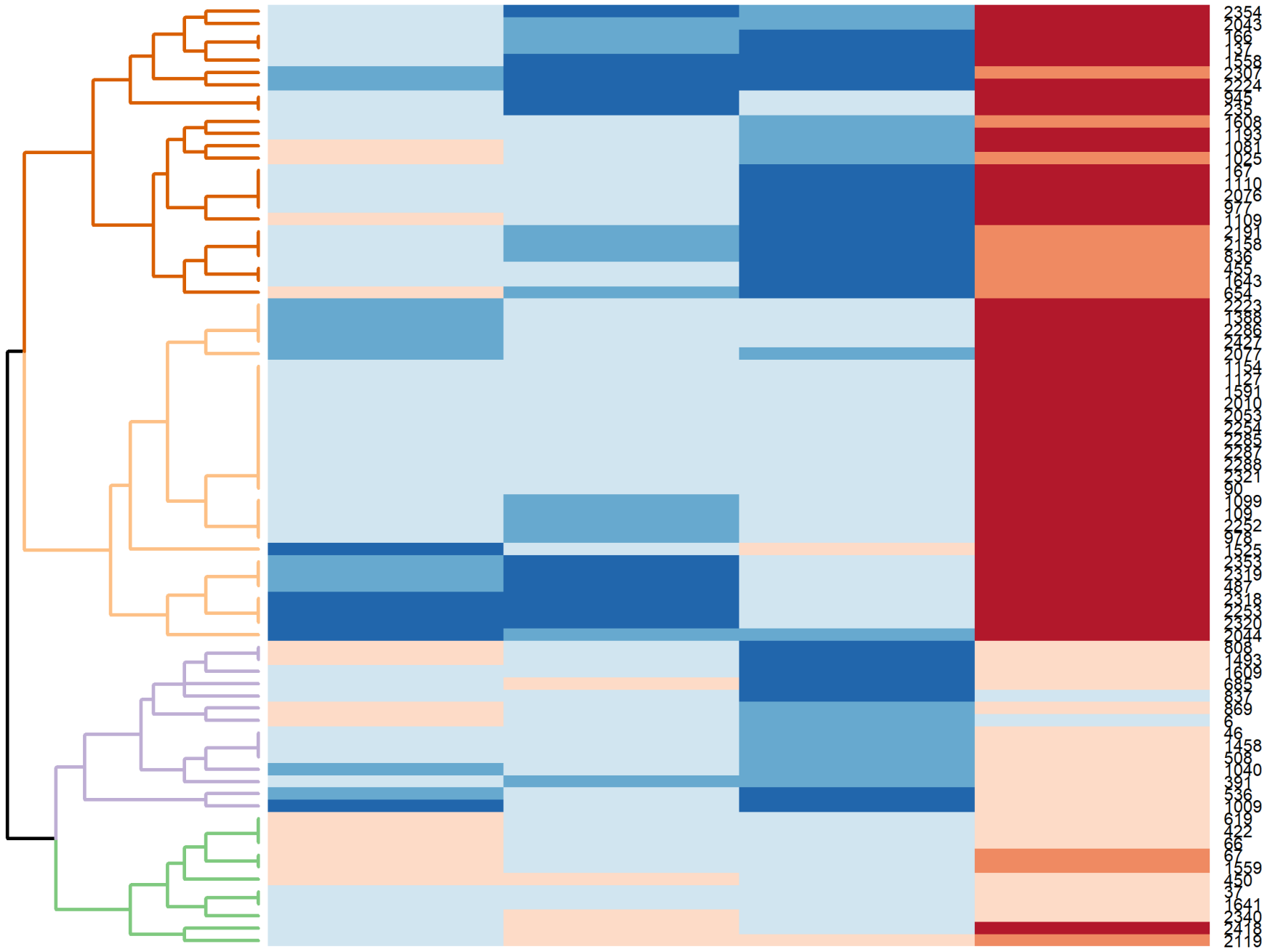
■	> 99%	■	> 95%	■	wet	■	dry
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3 years prior to fire



PDSI departure

■	> 99%	■	> 95%	■	wet	■	dry
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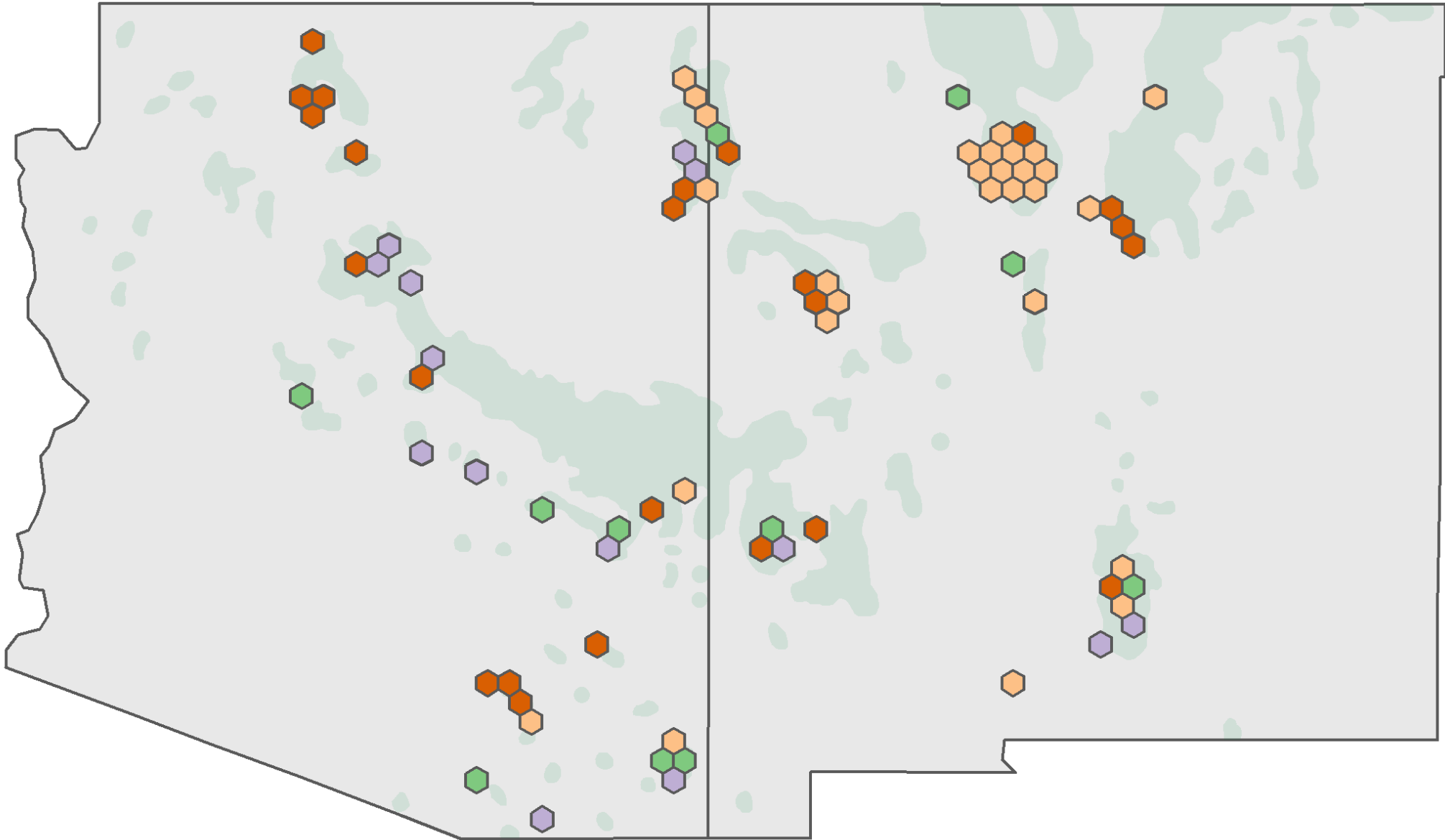
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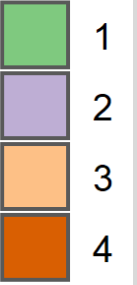
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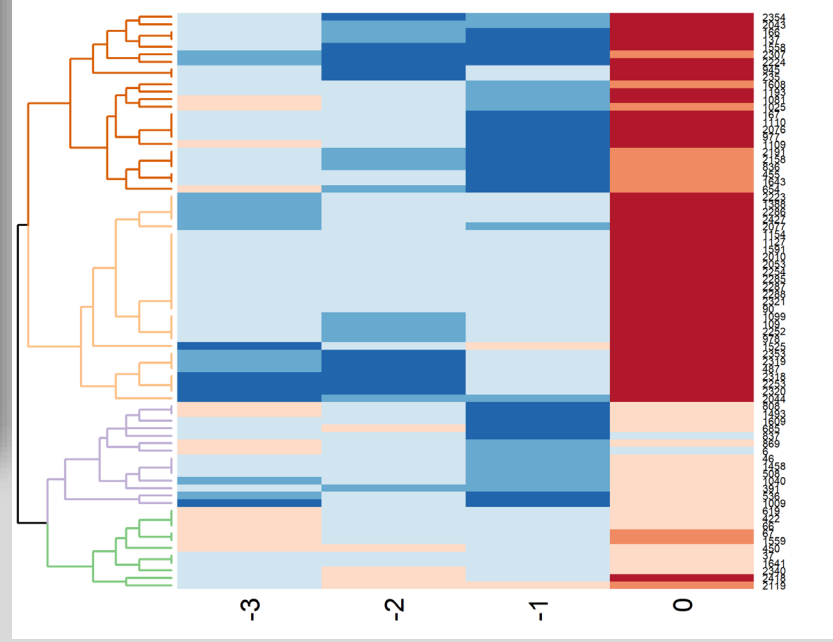
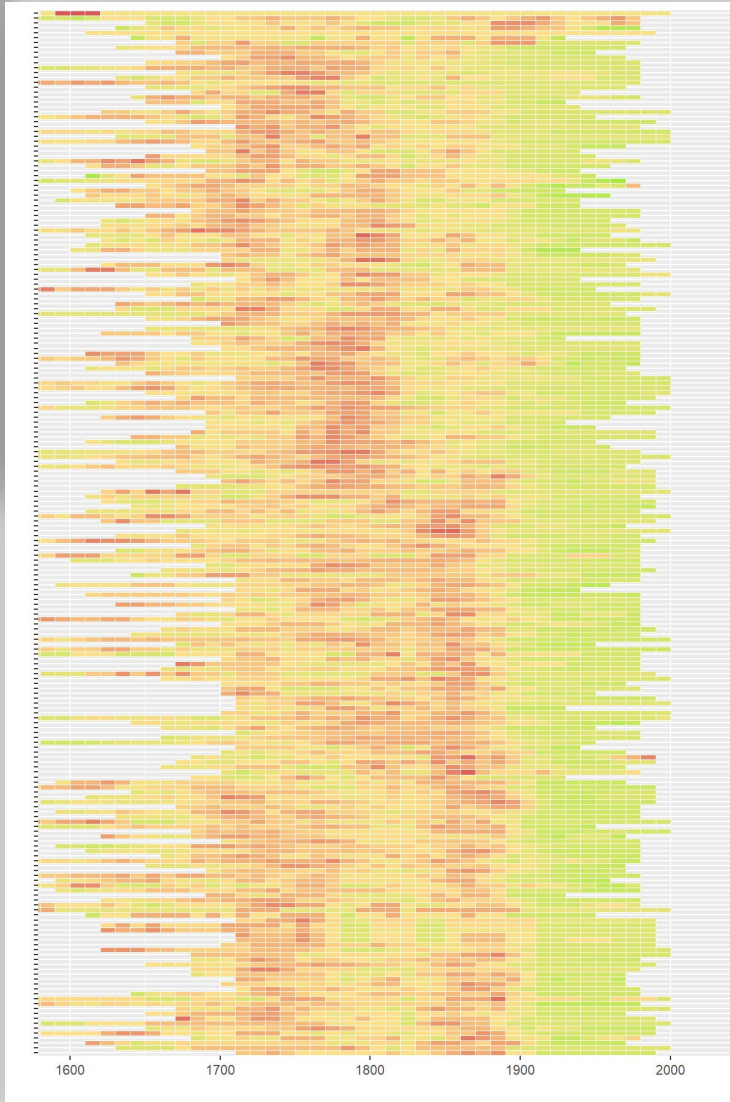
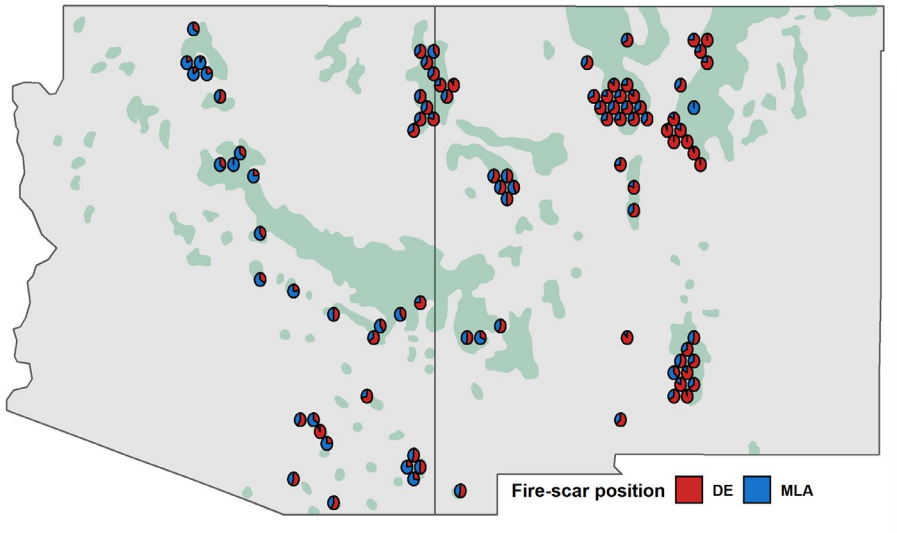
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SEA
cluster

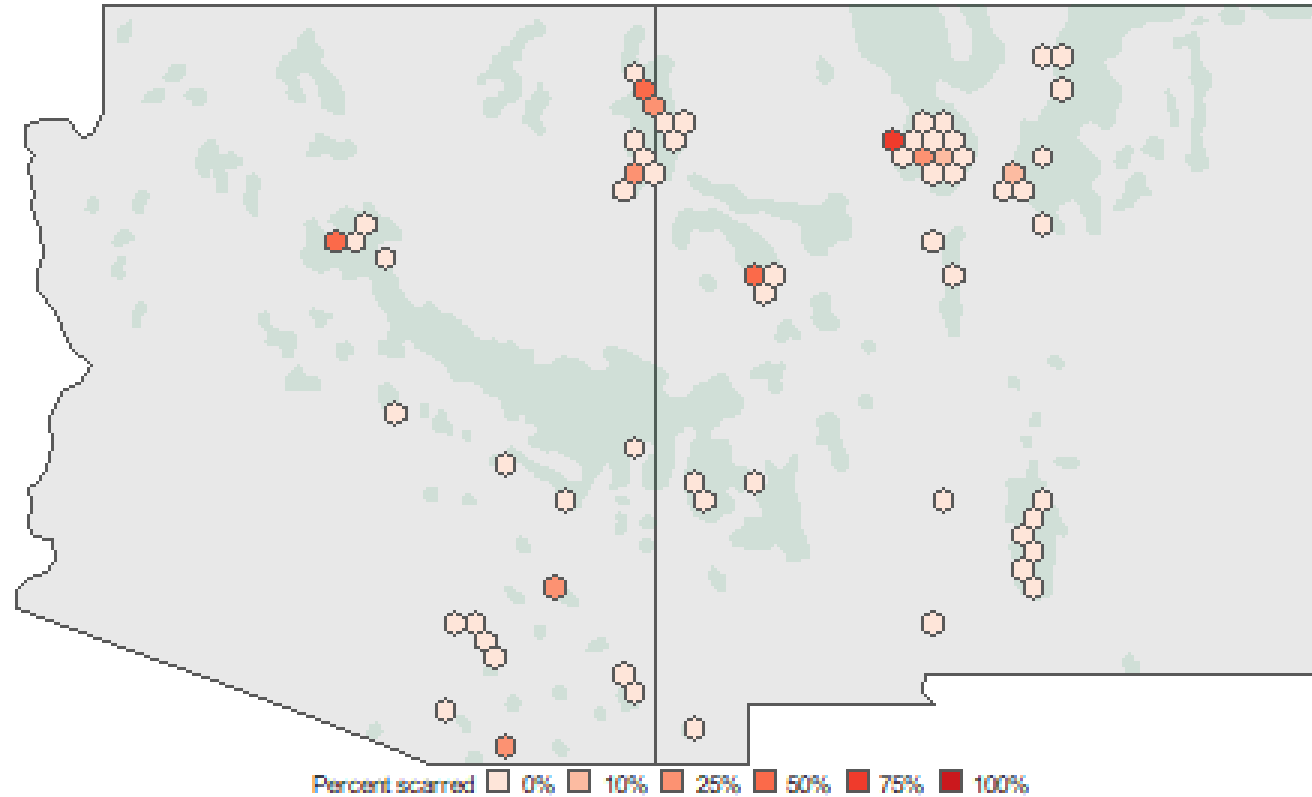




There's great value in historical pyrodiversity

THANK YOU

Year: 1600



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