Supplementary Table 1. The ten most extreme Z-score normalized August  $T_{\text{max}}$  values of instrumental (regional-averaged PRISM reconstruction target) and reconstructed data for the period 1895-2021.

Coldest				Warmest			
Year	PRISM	recon.	Y	/ear	PRISM	recon.	
1927	-2.36	-1.44	2	2020	2.97	1.77	
1923	-2.16	-2.07	1	937	2.10	0.85	
1968	-2.15	-1.42	2	2011	1.94	0.53	
1920	-1.87	-1.40	2	2019	1.75	0.81	
1925	-1.82	-2.09	1	960	1.70	1.37	
1993	-1.58	0.99	2	2000	1.68	2.54	
2016	-1.52	-1.05	2	2002	1.66	2.11	
1967	-1.52	-2.40	1	938	1.63	0.70	
1921	-1.51	-0.60	1	900	1.47	0.92	
1916	-1.45	0.13	1	934	1.42	1.40	



Fig. S1 Distribution of individual core samples (gray) and trees (black) at any given time of the chronology. The dashed line indicates 1662 - the cutoff point for the analyzed reconstruction.



**Fig. S2** Running correlations between the MXD chronology and daily-resolved Tmax for 10-31 day windows, for the period 1981-2020. Light orange shading indicates window of significance testing, darker orange highlights the window identified as the strongest monthly variable.



**Fig. S3** Kernel-fitted density distributions of the difference between correlations of the MXD chronology with monthly August Tmax and daily-averaged Tmax of 1312 different Julian date windows, tested 10,000 times on 40 years of synthetic data.



**Fig. S4** (a) Timeseries comparison between regional PRISM August Tmax (dashed line) and the MXD chronology, rescaled using the quantile mapping approach, regressed on the same temperature data (solid blue line). (b) Scatterplot between the same variables as in (a). (c) The squared coherence between instrumental data and MXD index for the period 1901-2021 is plotted (solid blue line), with dashed and dotted lines indicating the 95% and 99% confidence thresholds for statistical significance.



Fig. S5 Relationship between the MXD and TRW chronology from PNF. The year 1698 is highlighted.



Fig. S6 Reconstructed PDSI for 1698 (from the North American Drought Atlas; Cook et al. 1999).