



ENVIRONMENTAL FACTORS CONTRIBUTING TO THE EMERGENCE OF SOUTHERN GREAT PLAINS WILDFIRE OUTBREAKS



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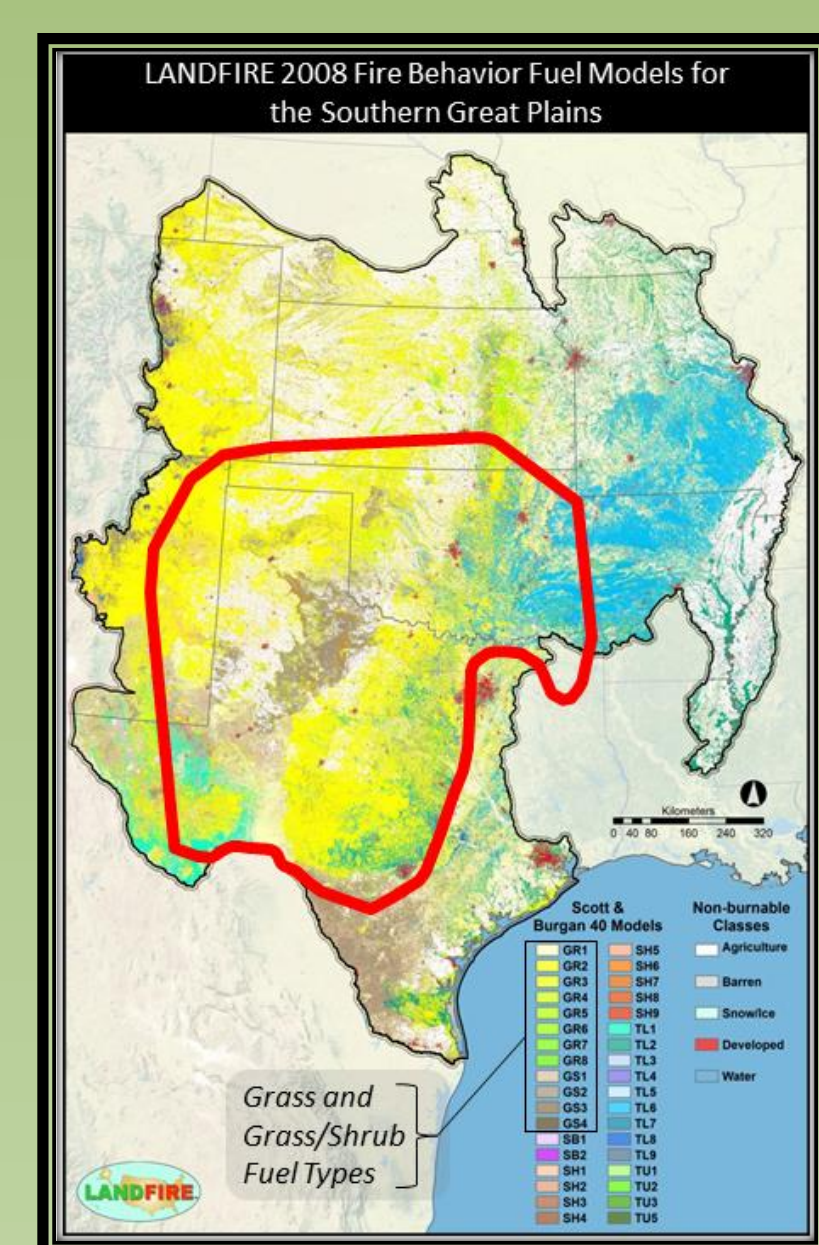
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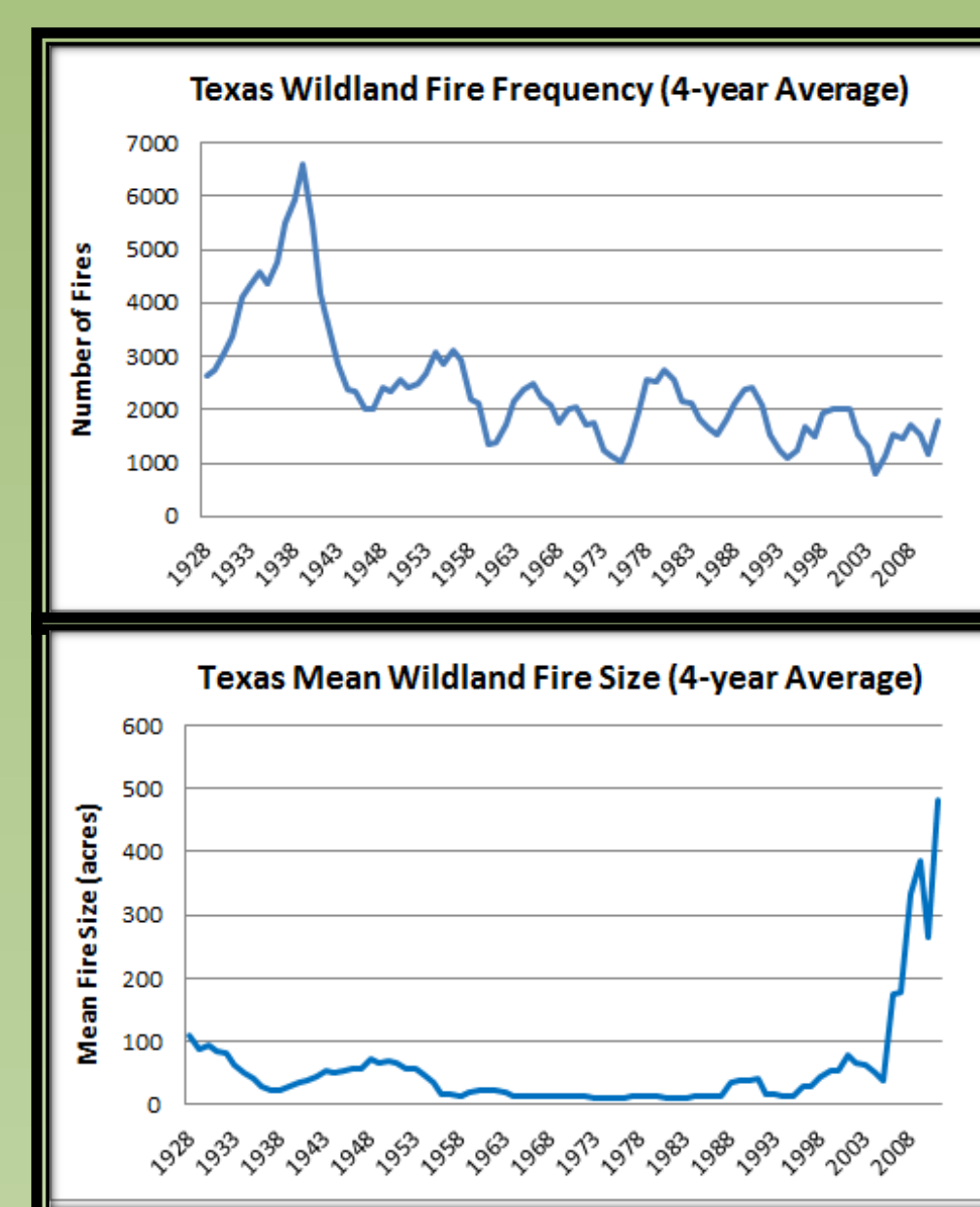
INTRODUCTION

- Traditionally, operational efforts in fire meteorology and predictive services have focused on short-term, or dynamic, fire regime considerations such as vegetative responses to seasonal variability and the daily state of weather.
- Due to the recent disastrous public impacts of southern Great Plains wildfire outbreaks (SGPWOs), meteorologists and fire analysts now strive to better understand long-term trends in climate and vegetative fuels as well as population and socio-economic conditions that have made the region vulnerable to violent “firestorms”.
- This study examines long-term changes to the Great Plains’ fire regime in Texas that have led to an increased environmental risk of wildfire outbreaks. An example of how these factors have amplified the region’s vulnerability to wildland fire and contributed to the emergence of SGPWOs is illustrated by events at Cross Plains, Texas, where 120 homes, churches, and businesses were destroyed and two persons killed during a regional fire outbreak on 27 December 2005.

HISTORICAL FIRE TRENDS

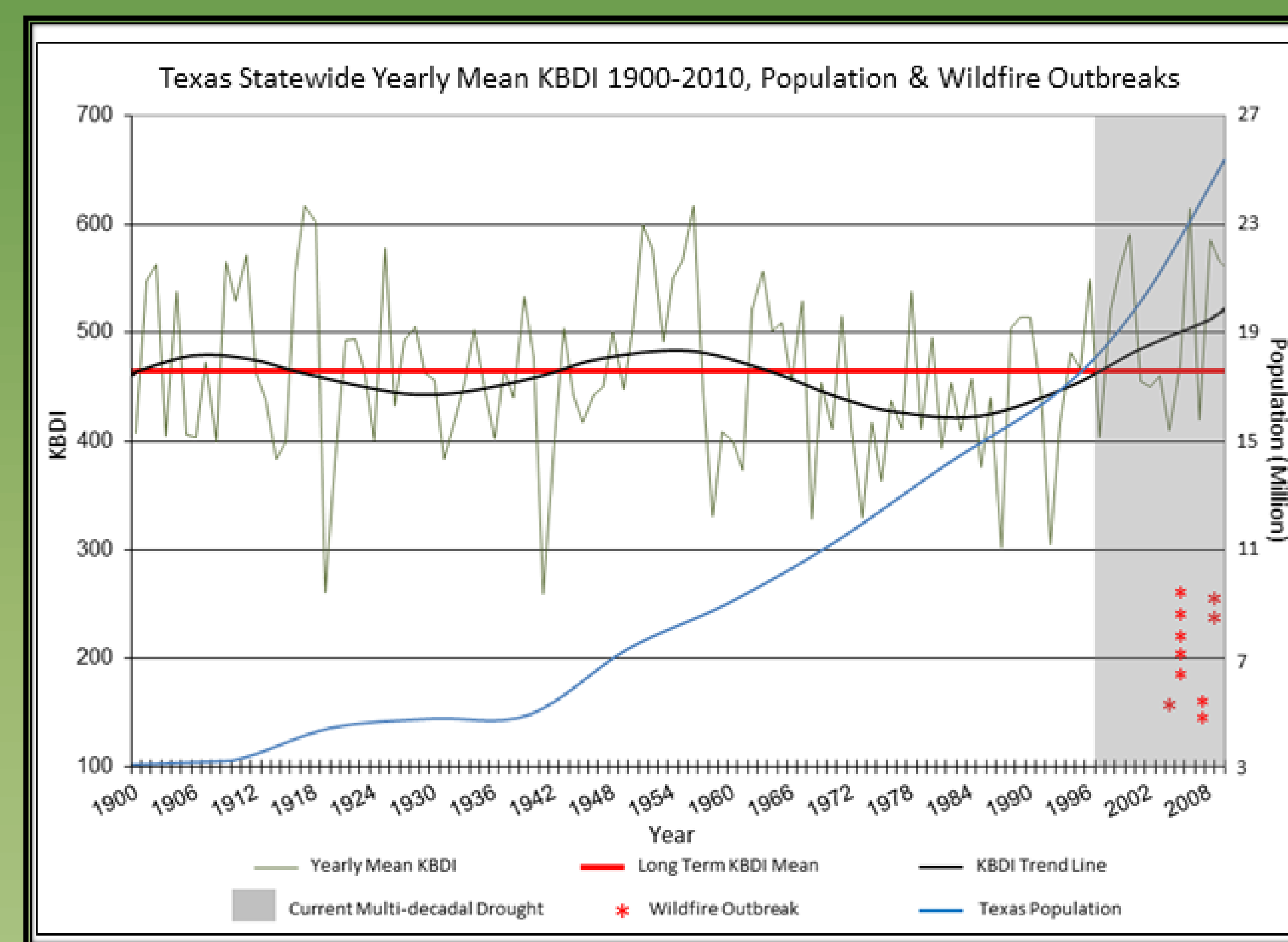


Left – LANDFIRE 2008 fuel models showing grass & grass-shrub dominant vegetative fuels in the area impacted by the 2005-2009 southern Great Plains wildfire outbreaks (red outline). Right – four-year weighted average wildland fire occurrence and mean wildland fire size in Texas (1925-2011).



Aerial photos of increased woody vegetative species on the Matador Wildlife Management Area between 1937 and 2011.

CLIMATE, POPULATION, AND LAND USE



Texas statewide yearly mean KBDI (1900-2010) plotted with population and SGPWOs. The current period of high KBDI indicative of a multi-decadal drought is shaded. SGPWOs have occurred in association with rapid population growth during this modern long-term drought.

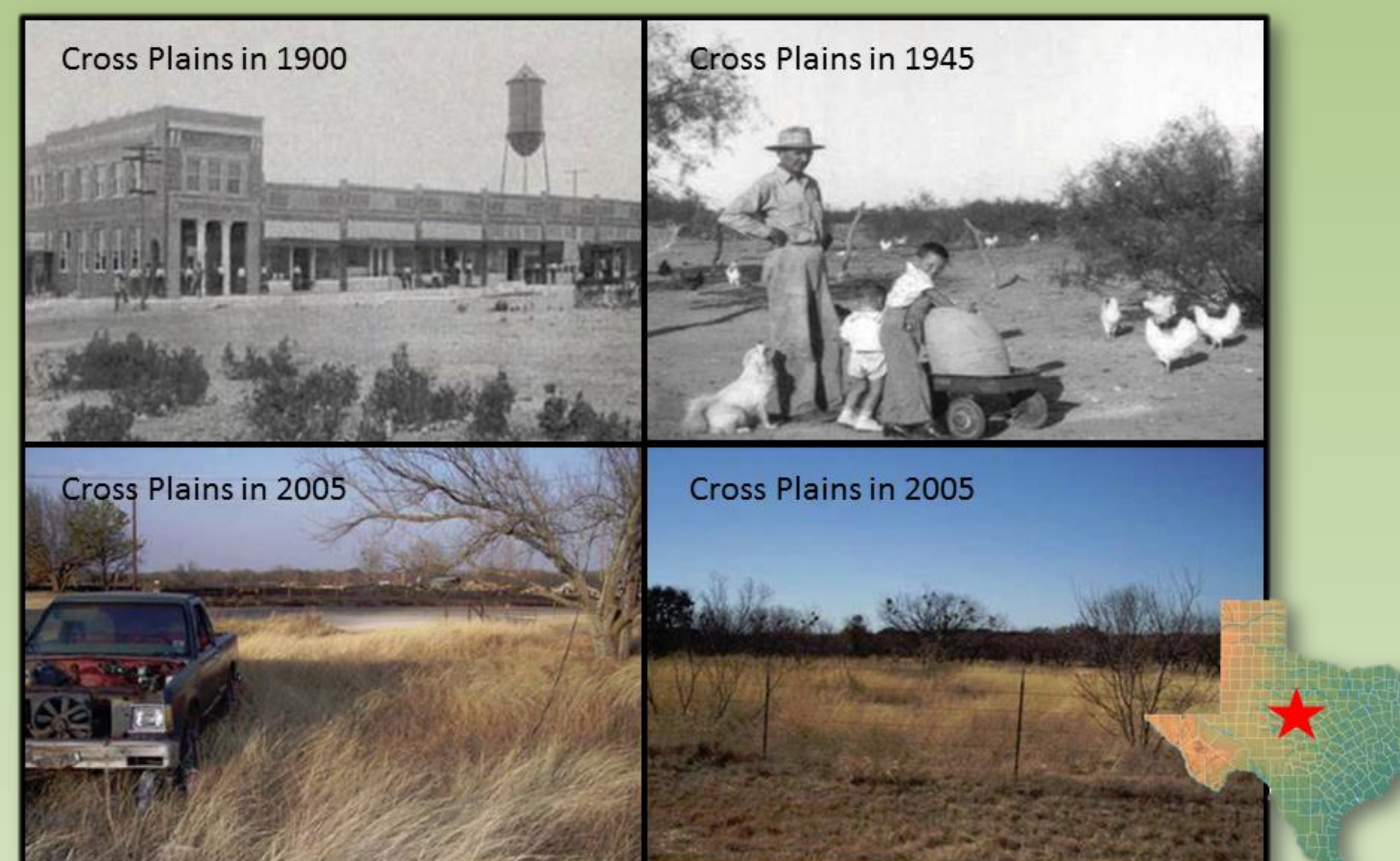
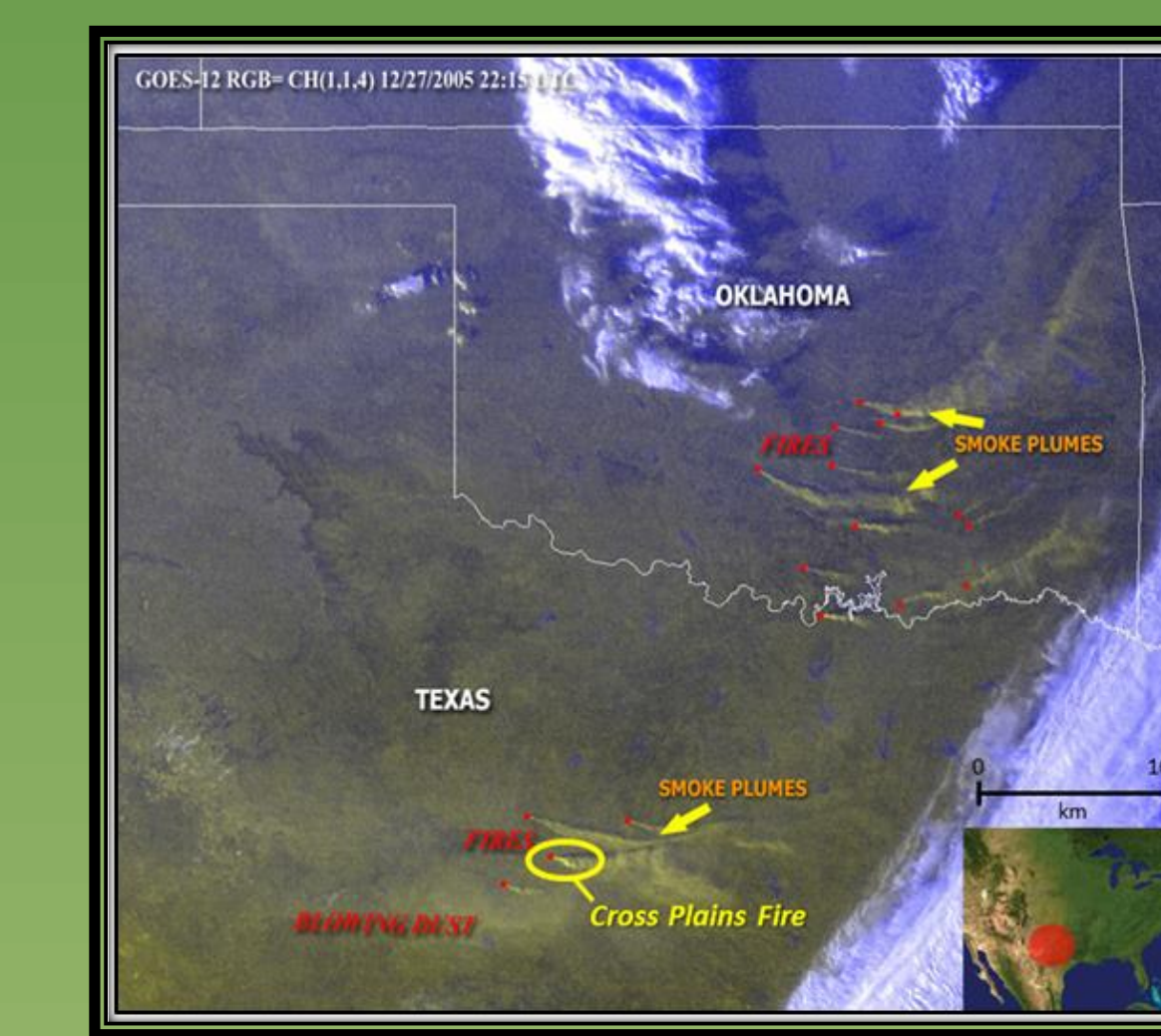


Photo sequence that shows changes in the vegetative environment, particularly an increase in grasslands at Cross Plains, Texas, between 1900 to 1945 and 2005.

CROSS PLAINS, TEXAS - 27 DECEMBER 2005



Left – NOAA satellite image of SGPWO highlighting the Cross Plains Fire at 2215 UTC 27 December 2005. Right – TA&MFS photograph of 27 December 2005 wildfire aftermath at Cross Plains, Texas.



Land Use-Fuels

TA&MFS graphic that shows the combination of environmental factors attributed to an escalating threat of SGPWOs.

CONCLUSIONS

- TA&MFS wildland fire records show that despite a general decline in the number of annual wildfires, a dramatic increase in mean fire size has occurred during the past decade. *Note: this data is biased by changes in sampling practices since 2000.* Portions of the Great Plains have seen an increase in woody species during the last century, which may be symptomatic of a general decrease in fire.
- Long-term trends in KBDI indicate three multi-decadal droughts in the past century. The most recent prolonged drought began in the late 1990s.
- The population of Texas (regionally representative) has increased dramatically since the previous long-term drought of the 1940s-1950s. Along with increased population, socio-economic changes have resulted in a reduction of grazed/plowed agricultural lands in favor of conserved grasslands.
- These environmental trends, illustrated by events at Cross Plains, Texas, have supported the emergence of SGPWOs within the modern southern Great Plains fire regime.

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