# Characterizing and Understanding the Causes of Drought in the Northern Great Plains

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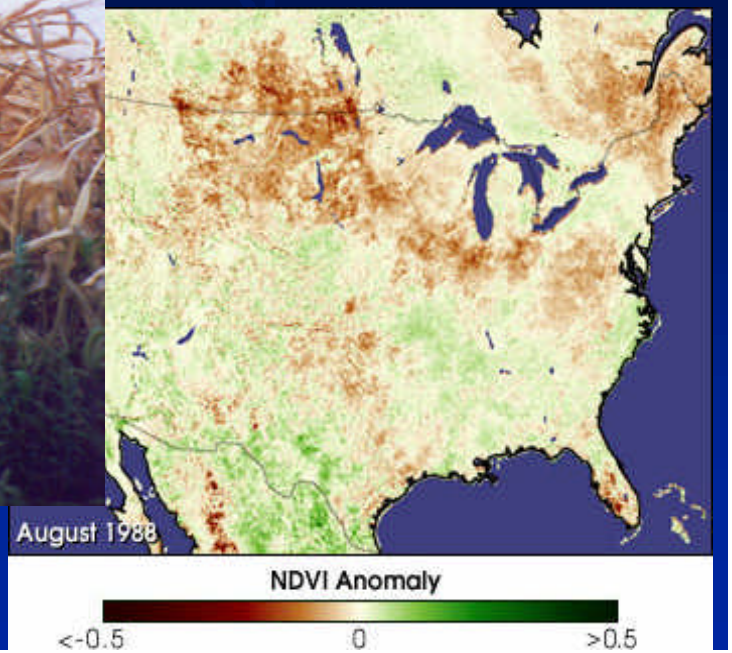
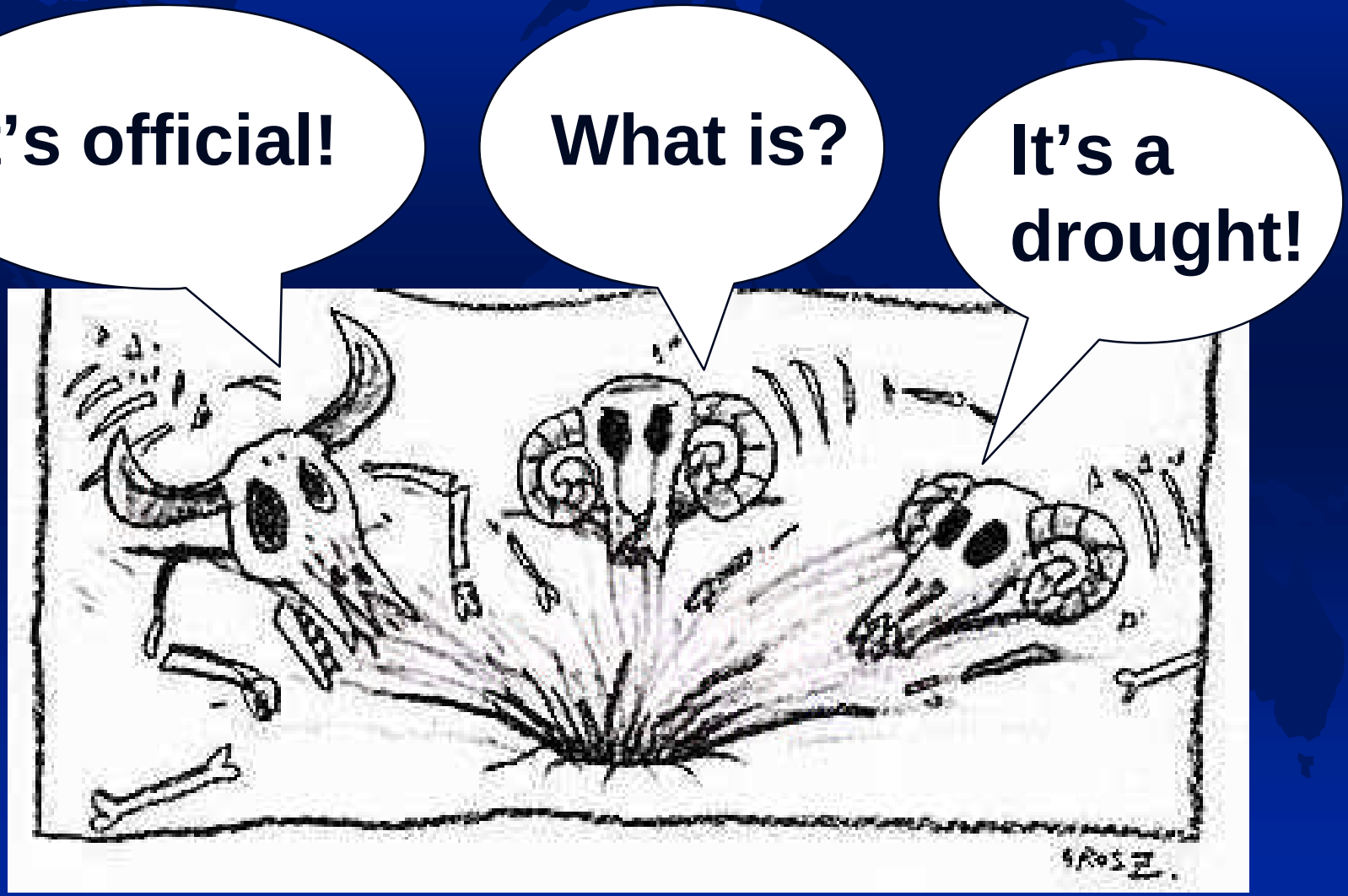
# DRI: An outstanding opportunity for international collaboration

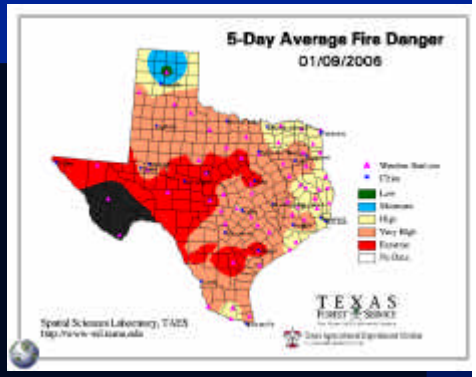
- **Overview of on-going research projects closely related to the major themes of DRI**
- **Highlight opportunities for collaboration**



# 1. Measuring/Quantifying Drought (Theme 1)



# 1. Measuring/Quantifying Drought (Theme I)




## "Drought Monitoring Index for Texas"

**Texas Water Development Board**

**Co-PIs at Texas A&M:**

**J. Nielsen-Gammon (State Climatologist, Atmospheric Sciences Professor)**

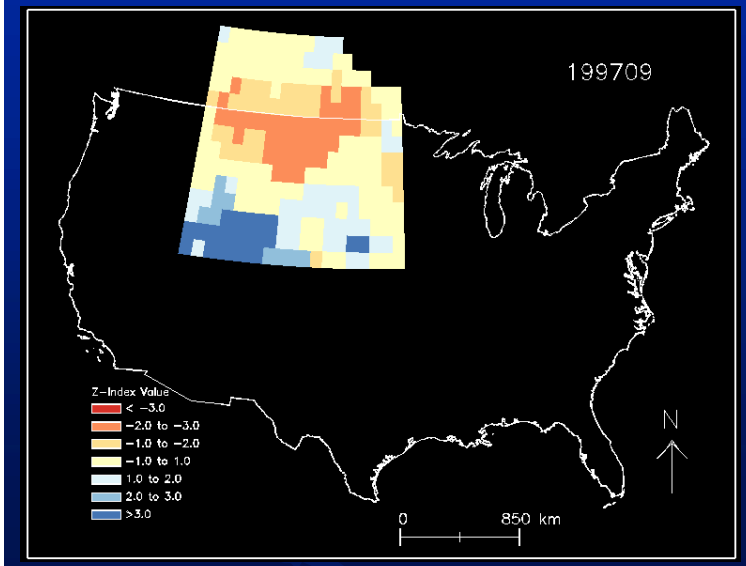
**R. Srinivasan (Director of Spatial Sciences Lab, Forest Science Professor)**

**T. Miller (Soil & Crop Sciences Professor)**

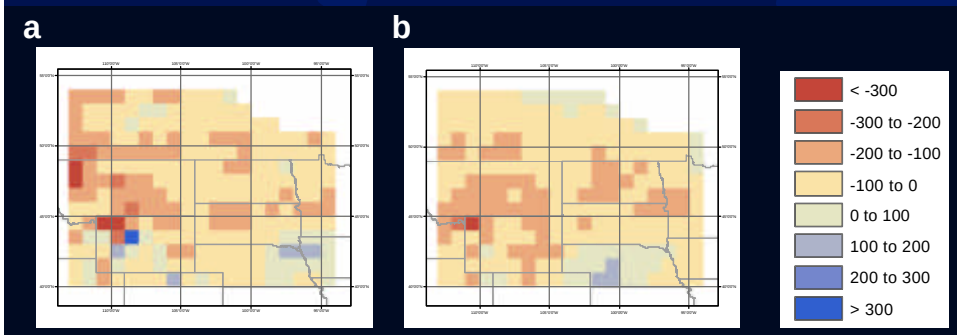
**Objectives:**

1) Develop operational definitions of drought
2) Identify current drought monitoring tools
3) Evaluate indices to determine which are the most appropriate for monitoring drought in Texas
4) Develop guidelines for reporting drought conditions at the **local level**

# 2. Understanding the Causes of Drought (Theme III)




Collaborator: D. Kluver (University of Delaware)




**Seasonal snowfall anomalies (mm) in winter (a) and spring (b) associated with the five driest summers between 1920–1999 [1961, 1936, 1988, 1934, 1931]**

## Current Research

**Observational and modeling studies that examine the role that surface boundary conditions (snow, soil moisture) play in initiating and sustaining droughts in the Northern Great Plains**

- ***What is the physical link between snowfall anomalies and drought?***
- ***How important is moisture recycling?***
- ***Are there specific thresholds for soil moisture/snowfall anomalies?***

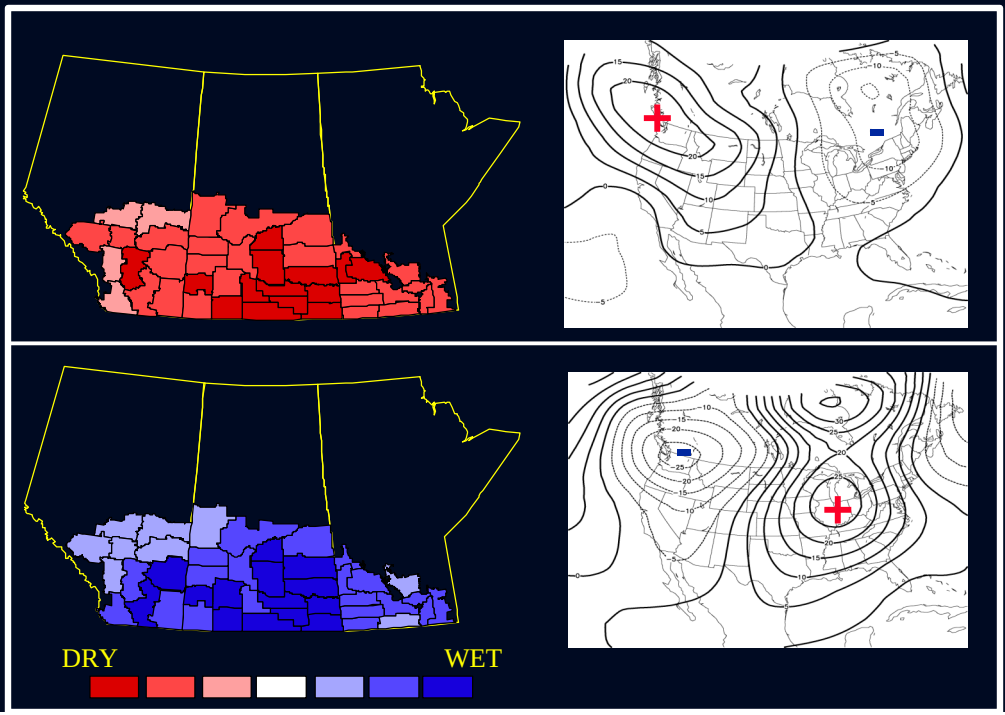
Quiring, S. M. and D. B. Kluver (submitted Jan 2006) Relationship Between Winter Snowfall and Summer Drought in the Northern Great Plains of North America. Geophysical Research Letters.

# 3. Developing a Drought Climatology (Theme 4)

Collaborator: T. Papakyriakou (University of Manitoba)

Quiring, S. M. and T. N. Papakyriakou (2005) Characterizing the Spatial and Temporal Variability of June–July Moisture Conditions in the Canadian Prairies. *International Journal of Climatology*, 25: 117-138.

- Examined frequency, severity, & spatial extent of summer moisture anomalies (1920–1999)
- Identified major spatial patterns & drought periodicities

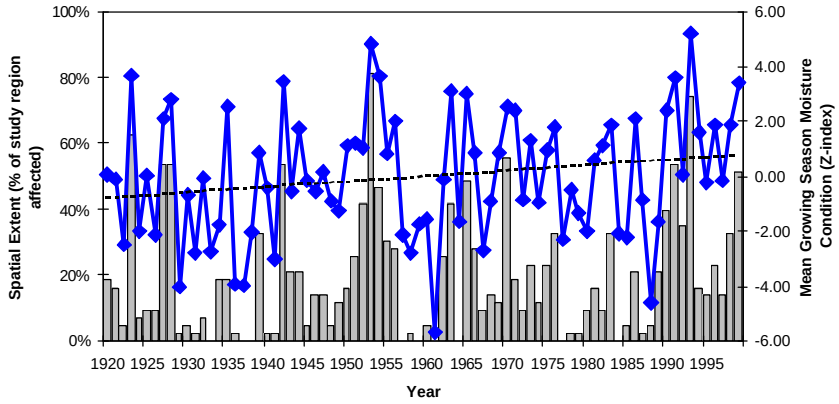



## Future Research:

Expand spatial extent of the study region to include the Northern Great Plains (U.S.)

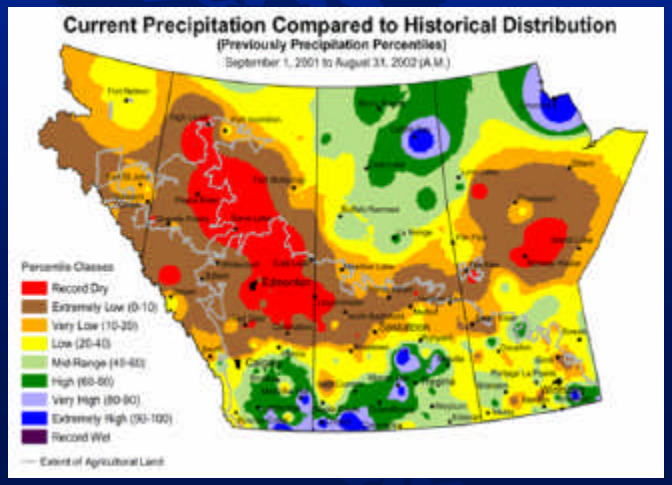
Expand temporal extent to include 2000–present

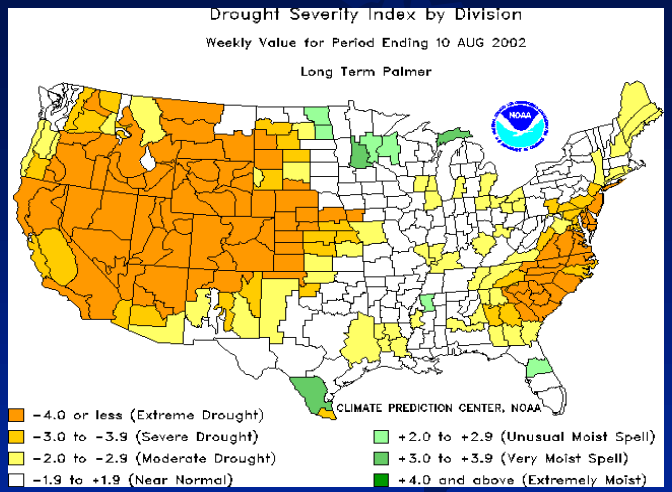
Place recent prairie drought (1999–2004) into historical context




Severity (solid line) and spatial extent (bars) of summer moisture anomalies in the Canadian prairies (1920–1999)

# Potential Contributions/Collaboration with DRI




1) Extend and apply the results of DRI research to the United States (Northern Great Plains)

2) Collaborate with DRI researchers on projects of mutual interest (likely related to Themes I, III, and IV)

3) Data/knowledge exchange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