

# ***Potential Impacts of Climate Change on Water Supplies Across Oklahoma During the 21st Century***

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# ***Climate Change & Global Warming: Extreme Viewpoints***

- Senator James Inhofe (R, Oklahoma), Chair, Senate Environmental and Public Works Comm., in a speech to the US Senate on January 4, 2005 — “I called the threat of catastrophic global warming the ‘greatest hoax ever perpetrated on the American people’.”
- British Prime Minister Tony Blair in a speech on September 14, 2004 — “I want to concentrate on what I believe to be the world's greatest environmental challenge: climate change.”



'Oh great, now we can't talk about religion, politics, OR the weather.'

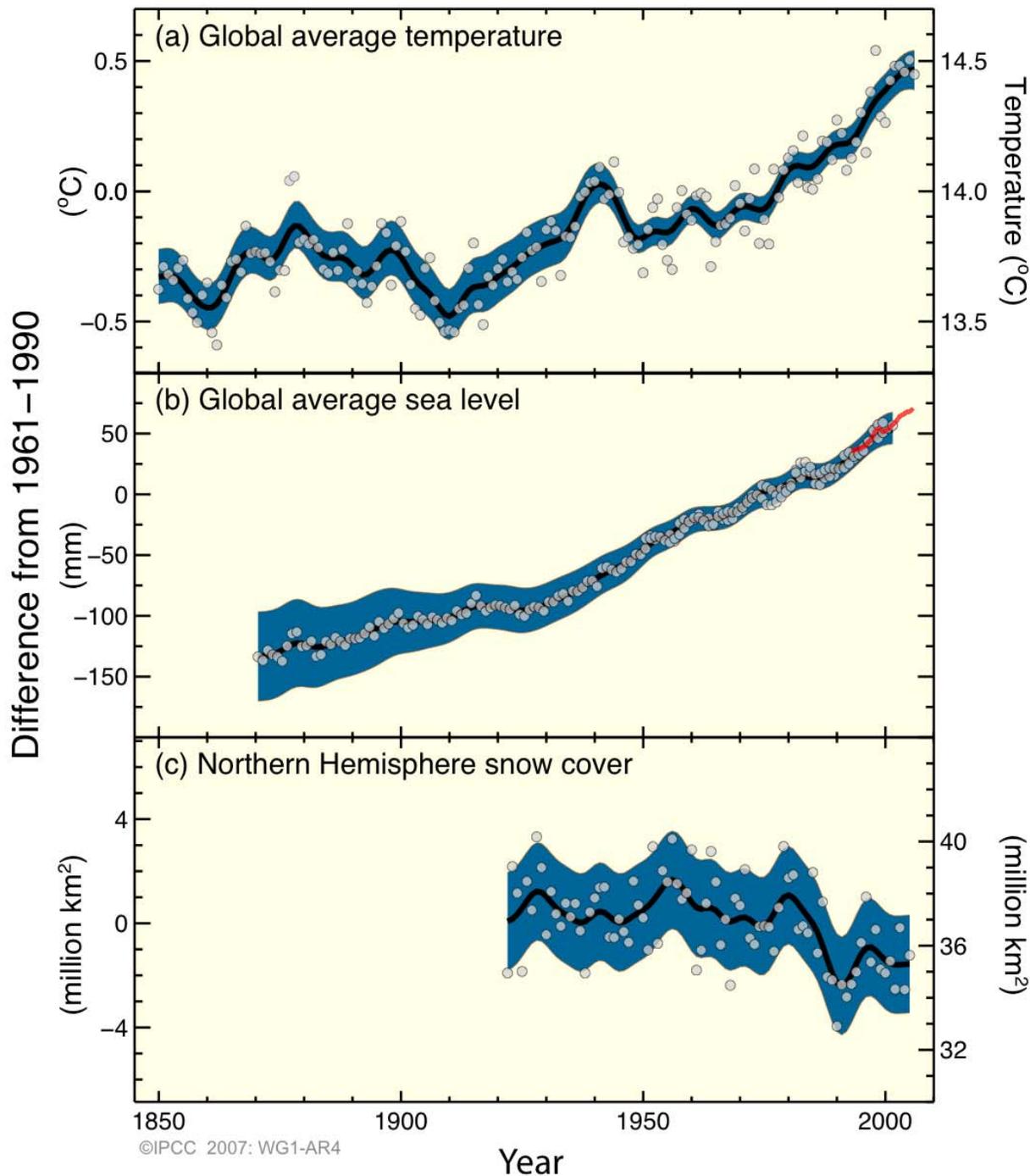
# **IPCC:**

## ***Intergovernmental Panel on Climate Change***

- Established in 1988 by United Nations Environment Program and World Meteorological Organization
- Not to do research, but to synthesize and assess it
- Response to scientific predictions of the 1970s: global warming due to greenhouse gas emissions likely to become a problem
- Today: scientific experts from > 130 countries
  - Most recent report > 800 authors > 2500 peer reviewers
- Historically unprecedented: scale, scope, ambition
- Summary approved by consensus (including representatives of the Bush Administration) at meetings of the IPCC

# ***Observational Evidence: The Globe is Warming***

## Changes in Temperature, Sea Level and Northern Hemisphere Snow Cover

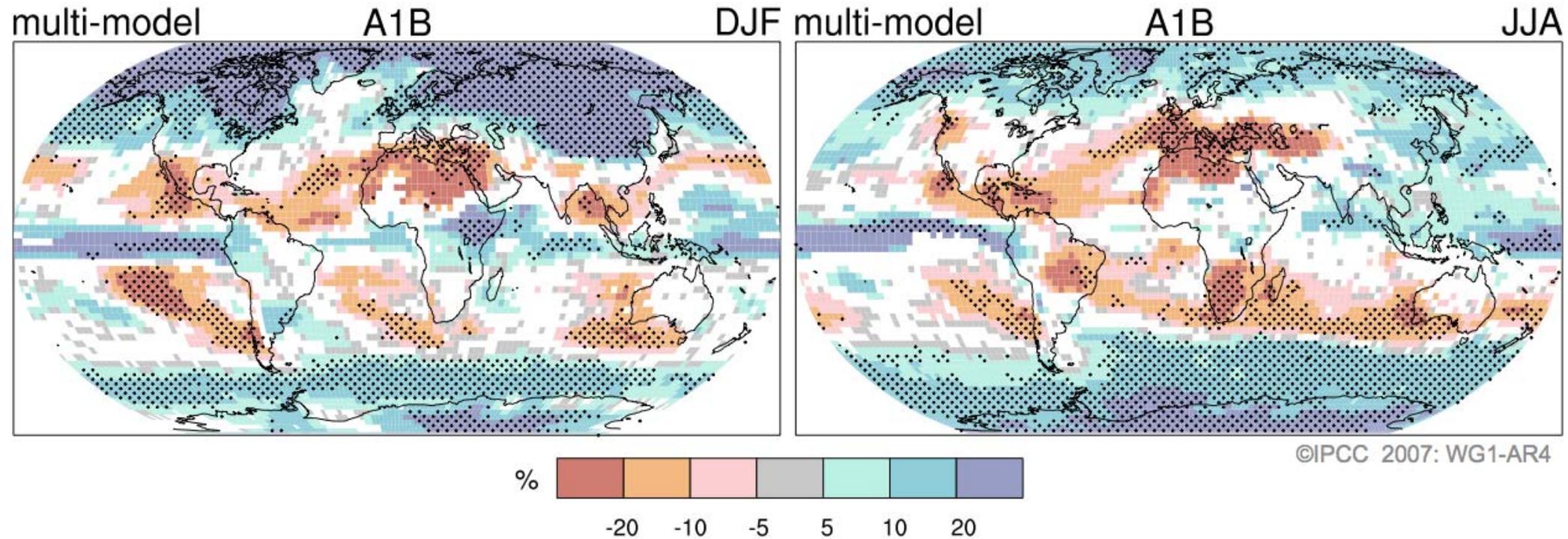


‘Warming of the climate system is **unequivocal**, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.’

# ***Projections***

# Projected Precipitation Changes for the Late 21st Century

## Projected Patterns of Precipitation Changes



# *Winners and Losers*

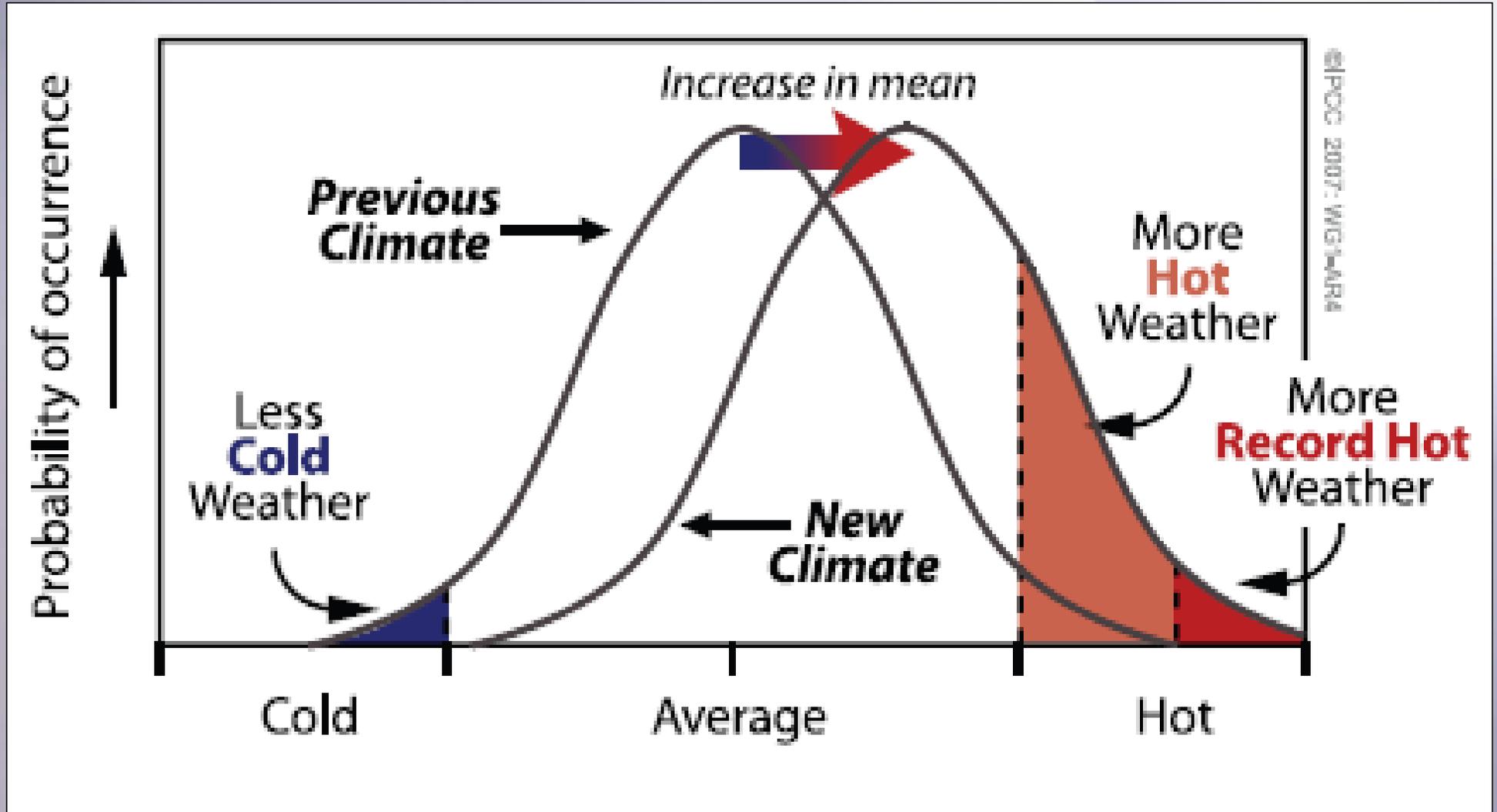
“There will be winners and losers from the impacts of climate change, even within a single region, but globally the losses are expected to far outweigh the benefits.”

National Academies' Report

“Understanding and Responding to Climate Change”



# Extreme Temperatures Will Increase



# Consider Headlines Already Being Written (From The Norman Transcript)

## Barge operators count their losses

BUFFALO, Iowa (AP) — Bob Niemela stared dolefully at 160,000 tons of limestone that won't be going anywhere soon because of the rain-swollen Mississippi River.

"It's terrible. We're left out at our busiest time for the river," said Niemela, general manager of Linwood Mining and Minerals Corp.

Behind the small mountain of rock, the Mississippi surged beyond its banks, a rare summer flood that's halted commercial traffic along a 500-mile stretch of the river from St. Paul, Minn., to St. Louis, and inundated some Midwest towns and farms.

The shutdown has left barge operators counting their losses and companies scrambling to stay in business.



AP/Carl Fox

course of action could be disaster emergency farms, offer assistance and give to repay government.

Governors of Minnesota, South Dakota, Illinois are seeking assistance Wisconsin Governor Thompson estimates 30 counties, including farm fields and

Sally Fritz gave Espy a muddy 1,400 acres western Wisconsin. "Other than 1988, this is probably the worst we've seen," F. In Prairie du

Norman Transcript  
11/15/92  
104th Year — No. 126 — Sunday 75¢

## Water shortage looms for world

Friday,  
July 30, 2004

water-saving drip systems pioneered in efforts, the bookening crisis in the

### Our view

#### PIPELINES

## More water wars feared as the West goes dry

The recent move by Oklahoma City to raise its water rates to residential and commercial users and to surrounding cities that are also customers reflects the nation's

USA Today newspaper reports that more pipelines like the one proposed for Nevada are needed as the population shifts from rural areas to larger cities. The pipeline

Norman Transcript



# Other Headlines Being Written (From Other Newspapers)

2 The Norman (Okla.) Transcript, Wednesday, January 12, 1994

## U.S. may face water shortages in many areas

By The Associated Press

In Florida there is a running battle over water resources among sugar-cane growers, urban development interests and environmental groups trying to

Perciasepe said that the doubling of the U.S. population since 1950 and the accompanying economic growth have placed tremendous pressure on water

33 percent — to 9,913 cubic meters of water per person.

That is still 21 times more water than Israel has or three times as much as France. Kuwait may be rich in oil, but the United States has 132 times more water.

One result of this abundance is that water has remained more cheaply priced in the United States than in many other countries.

Still, in the next 35 years the United States could face an additional 22 percent drop in availability, according to Population Action International. "The sheer volume of use of water could cre-

Our Next Crisis." Debra Knopman, Department of Interior deputy assistant secretary for water and science, maintained that at present there is no crisis. But, she said, the government's ability to deal with water problems is seriously fragmented.

"Water is split up" among a number of federal agencies, she said. For example, the Departments of Agriculture, Interior and Commerce all have a role in water policy and so do the EPA and Army Corps of Engineers.

Even within Interior, Knopman said, water issues are divided among the

Baltimore Sun  
12/7/93

## A thirsty world

Two decades ago, Americans learned a painful lesson about their dependence on oil. But the gas lines that spurred new ways of thinking about natural resources will soon seem a mild prelude to other kinds of scarcities. Around the world, a number of countries are rapidly outgrowing their supplies of fresh water.

some cases, outright scarcity. Some of those countries were in the arid Middle East, where water scarcity might be expected. But countries like Po-

## A Common Problem

### Conservation can protect North Texas' water

The lawn mowers are cranking up. The pools are getting clean. And the flower beds are prettifying up. It's spring, and that's the reason many of us live in the Sun Belt. We like the ease with which we can go outdoors.

But all isn't perfect. We have a growing conflict between people and resources. No tension

gallons of indoor water daily. Each of us can beat this problem. Just installing low-flow toilets or shower heads can save 300 million gallons a day according to the

### Drought leaves Hefner's lakebed high and dry

ter their maintain its th Texas

## Experts discuss long-term plan at conference

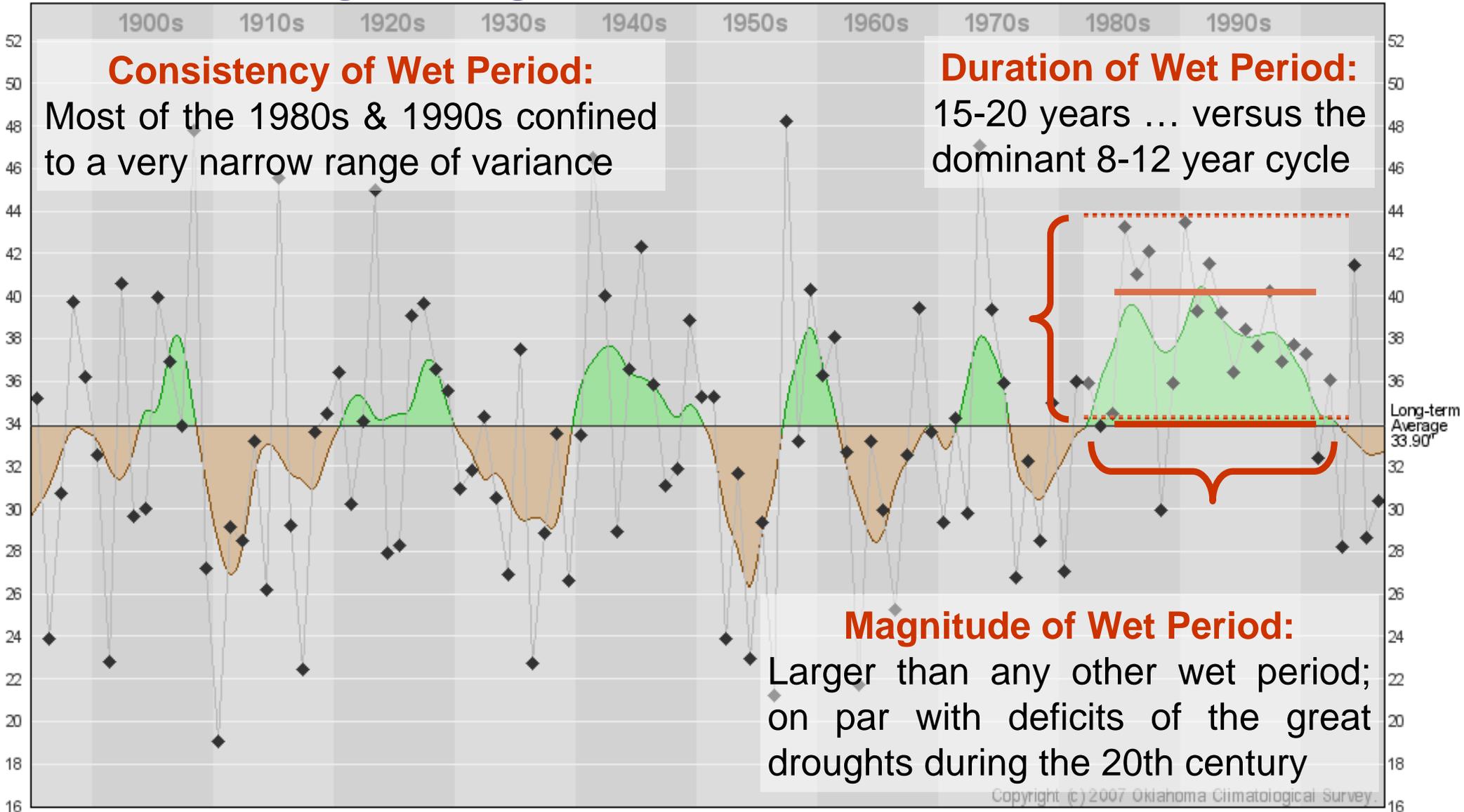
By Tony Thornton, Staff Writer

Rainfall alone won't solve the state's long-term water woes, speakers indicated Monday during the 27th annual Governor's Water Conference in Oklahoma City.



Dealing With Climate Change in Oklahoma  
28th Annual Governor's Water Conference  
October 25, 2007

# Beginning Point of All Discussions

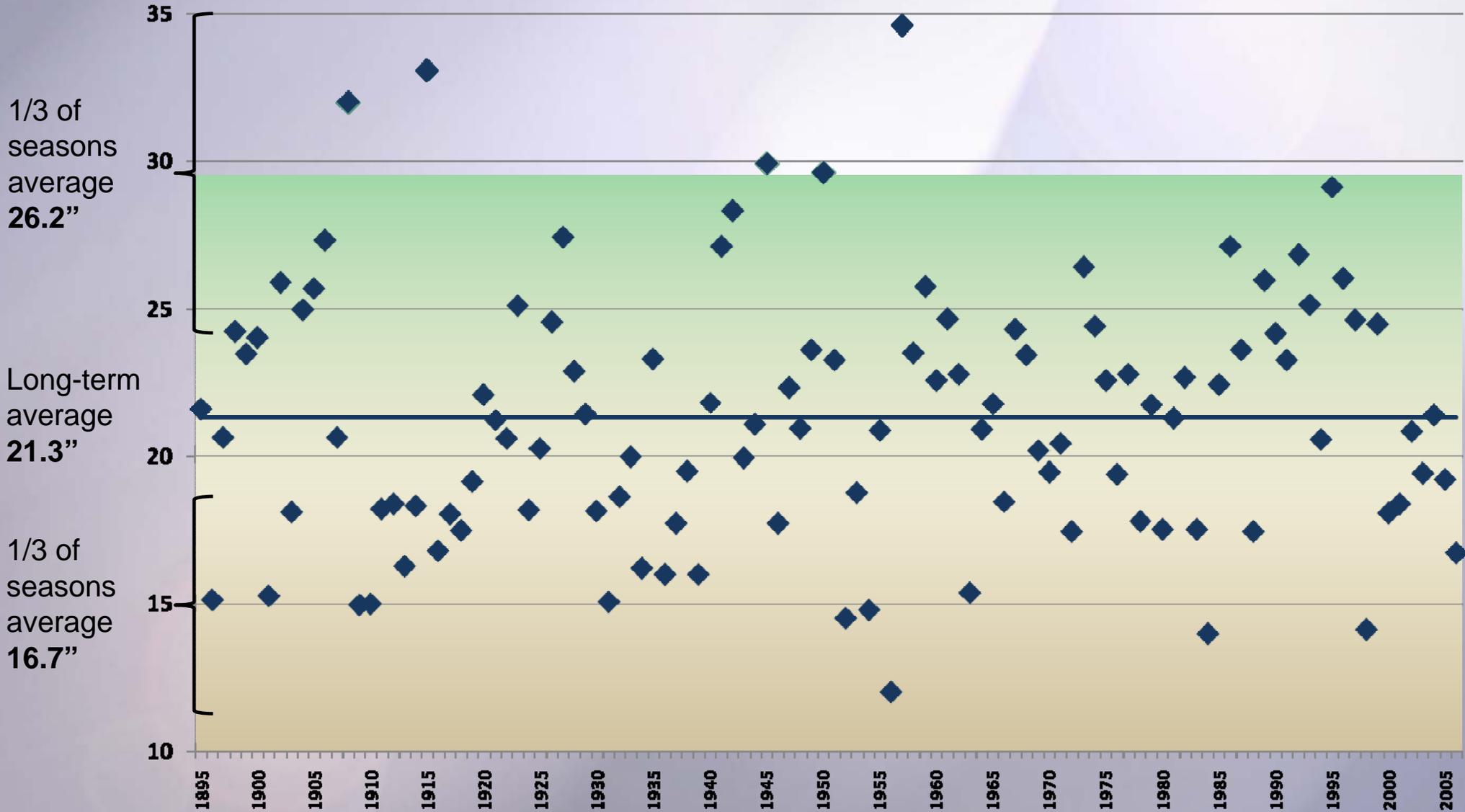


Annual Rainfall History with 5-yr Weighted Trends  
Climate Division OK-ST (Oklahoma Statewide): 1895-2006

Wetter historical periods  
 Drier historical periods

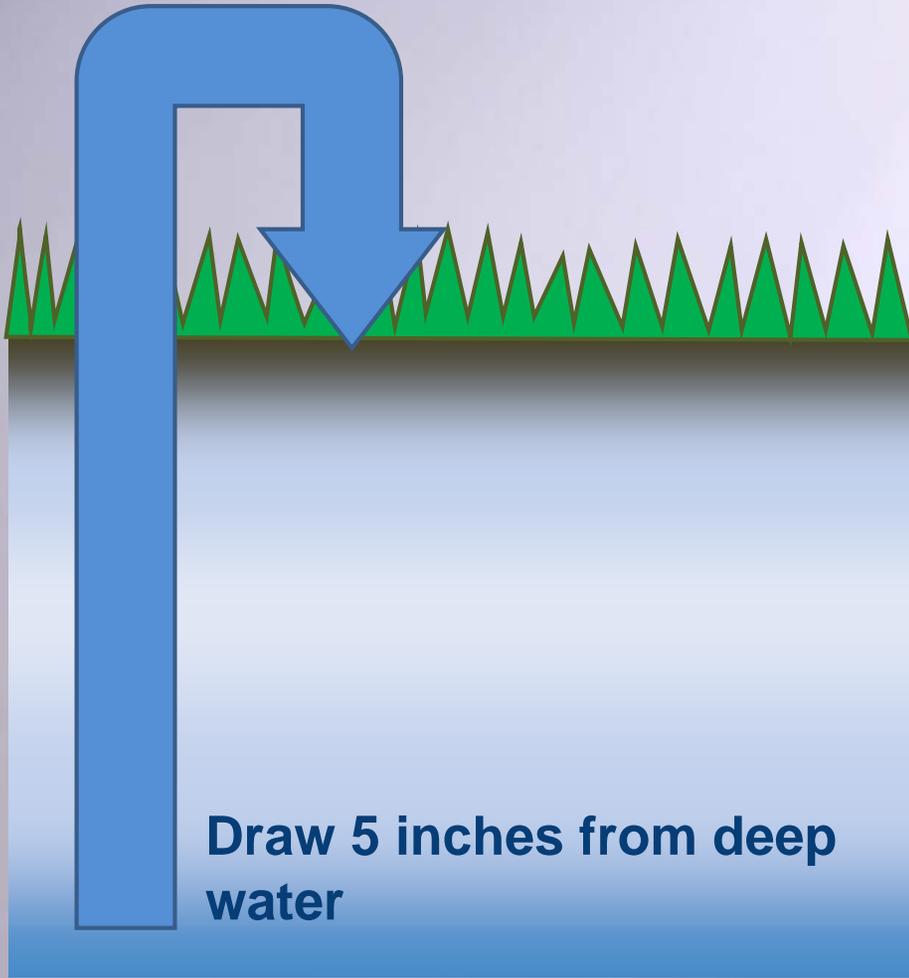
# We Don't Get "Normal" Rainfall

## Oklahoma's Warm Season (Apr-Sep) Rainfall, in inches: 1895-2006

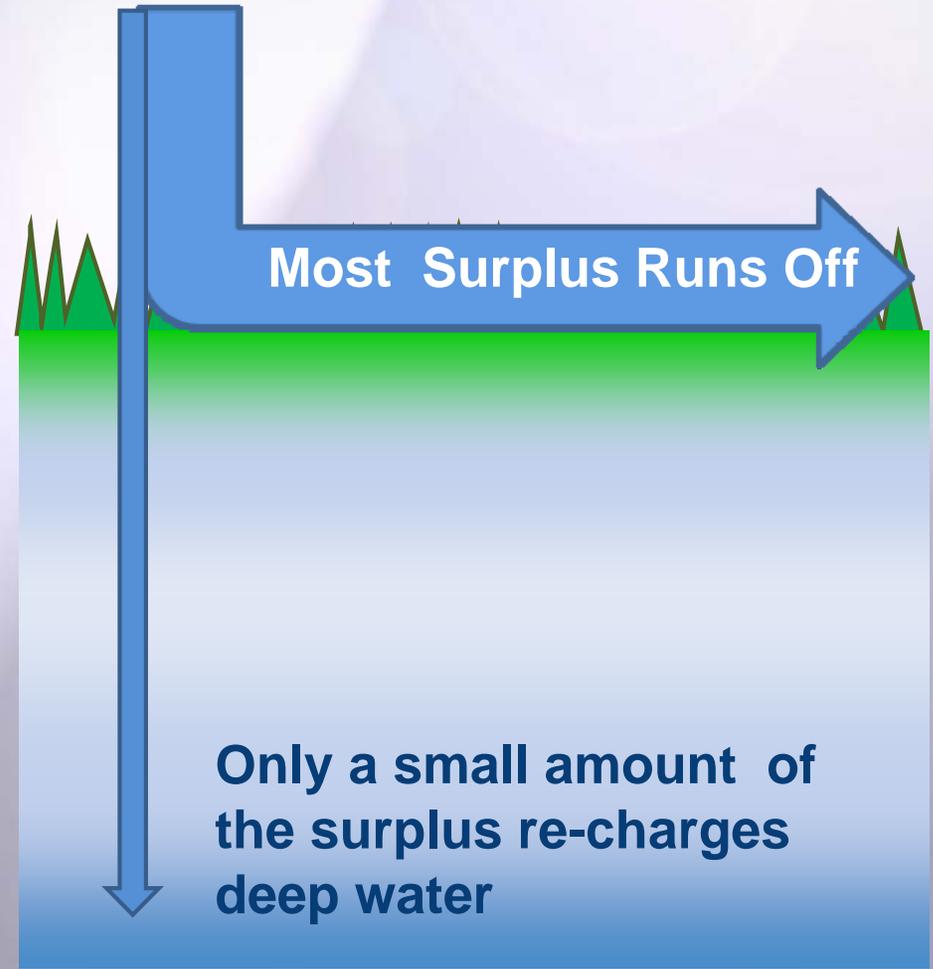


# ***If We Plan For The “Normal” Season...But...***

**In a typical “dry” season  
(5-inch deficit)**



**In a typical “wet” season  
(5-inch surplus)**



# *Implications for Oklahoma*

- The warm season becomes longer and arrives earlier.
- The cool season warms and shortens which leads to a longer frost-free period and growing season.
- Earlier maturation of winter wheat and orchard crops leave them more vulnerable to late freeze events.
- Year-round evaporation from the ground increases as does transpiration from green vegetation.
- Drought frequency and severity increases, especially during summer.
- Drier and warmer conditions will increase the risk of wildfires.
- Rain-free periods will lengthen, but individual rainfall events will become more intense.
- More runoff and flash flooding will occur.

# *Impacts From Climate Change: At The Citizen Level*

- Vast new sources of fresh, potable water will not materialize.
- Thus, more Oklahomans will be exposed to water stress!
- Natural systems will have to adapt, but the larger and faster the changes in climate, the more difficult it will be to adapt.
- Sustainability must be the design criteria on which to manage Oklahoma's water resources — lest we return to a dark period of unchecked consumptive use (i.e., from aquifers).
- Shrinking water supplies mean an increase in pollution and a decrease in water quality.

# ***The OCS Position on Water Resources & Climate Change***

## We Conclude The Following To Be True:

- The earth's climate has warmed during the last 100 years and will continue to warm for the foreseeable future.
- That fact means the citizens of Oklahoma, more and more, will come to depend upon and require adequate supplies of fresh water.
- Because our future lies in access to fresh water, we must exercise due diligence to protect our water resources.
- Whatever our future, water management plans developed for a warmer climate must measure and understand the water budget of Oklahoma and develop policies accordingly.

# Questions?

