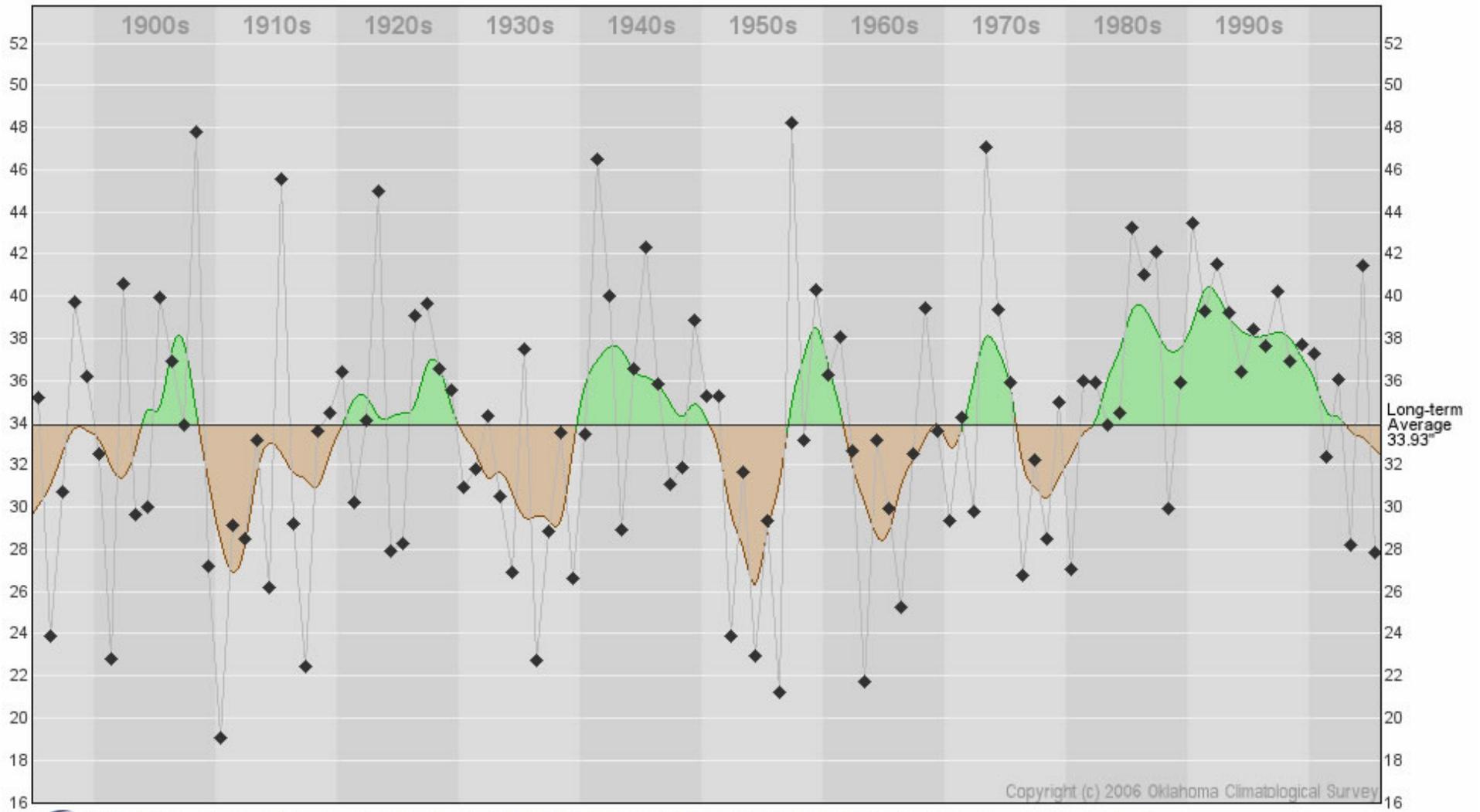


The Impacts of Drought On Navigation



Duane Smith
Executive Director
OWRB

State of Oklahoma
OWRB
WATER RESOURCES BOARD
the water agency



Annual Rainfall History with 5-yr Weighted Trends
 Climate Division 10 (Statewide): 1895-2005

- Wetter historical periods
- Drier historical periods

Oklahoma Water Law

- OWRB is responsible for appropriation of both surface and groundwater in Oklahoma:
 - ◆ Except in the Grand River Basin, where GRDA has stream water authority above Ft. Gibson Reservoir.
- Corps of Engineers lakes contain water storage that is managed for multiple purposes, including water supply, navigation, and hydropower.
 - ◆ Under optimal moisture conditions, water requirements for these purposes are met, but as drought sets in numerous problems may arise for users authorized to withdraw water from these sources.

Oklahoma Water Law

- In Oklahoma, the OWRB administers water rights for all purposes other than domestic. This includes water from federal reservoirs, although the Corps of Engineers requires water storage contracts with individual users.
- Permits within navigation system are conditioned on not diverting while releases are being made to support navigation (rule change in 2005).
- COE grants easements along navigation system allowing water use as long as it does not interfere w/navigation, especially under drought conditions:
 - ◆ If state gives permit (with conditions per navigation), Corps will issue conditional easement.
 - ◆ No easement without an OWRB permit.

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Drought Monitoring Duties

- Chair agency of the Water Availability and Outlook Comm. (WAOC) of the Oklahoma Drought Management Team
- Water Availability & Outlook Committee:
 - ◆ permanent working group;
 - ◆ directs efforts to monitor current water availability and moisture conditions and provide near-future estimates of water supply;
 - ◆ monitors water/moisture-related conditions and/or problems;
 - ◆ as drought conditions deteriorate, convenes regular meetings to assess drought trends and projections; and
 - ◆ provides information relevant to impending or ongoing drought in Oklahoma to the State Drought Coordinator, Drought Team, public, and media.

OWRB's

Drought Monitoring Partners

Oklahoma Department of Civil Emergency Management *State Drought Coordinator*

- Oklahoma Climatological Survey (Mesonet)
- Oklahoma Department of Agriculture (Forestry Services)
- Oklahoma Department of Environmental Quality
- Oklahoma Conservation Commission
- Oklahoma Department of Wildlife Conservation
- OSU Cooperative Extension Service
- Oklahoma Rural Water Association
- Oklahoma Municipal League
- National Weather Service
- U.S. Army Corps of Engineers
- Bureau of Reclamation
- U.S. Geological Survey
- Natural Resources Conservation Service

State/Federal Drought Response

- Corps of Engineers, Oklahoma Water Resources Board and Oklahoma Department of Transportation (Waterways Branch) coordinate drought response activities to minimize the potential impacts of drought to navigation on the McClellan-Kerr Navigation System.

State/Federal Drought Response

- During times of water use emergencies, state and federal agencies can expedite the normal water use process:
 - ◆ The Corps can provide access to water through easements for water supply storage owners whose intake structures no longer reach the water because of low lake levels.
 - ◆ The Corps will issue emergency Water Withdrawal Permits from Corps lakes for use of less than one acre-foot:
 - ◆ for domestic or industrial use only, not irrigation.
 - ◆ The OWRB works with water rights permit holders to keep them informed of drought conditions and locations of available water supply, including conditions on use.
 - ◆ ODOT (Waterways) monitors water levels at various locations along the McClellan-Kerr Navigation System and works with users to ensure that minimum flow levels are maintained to support navigation purposes.

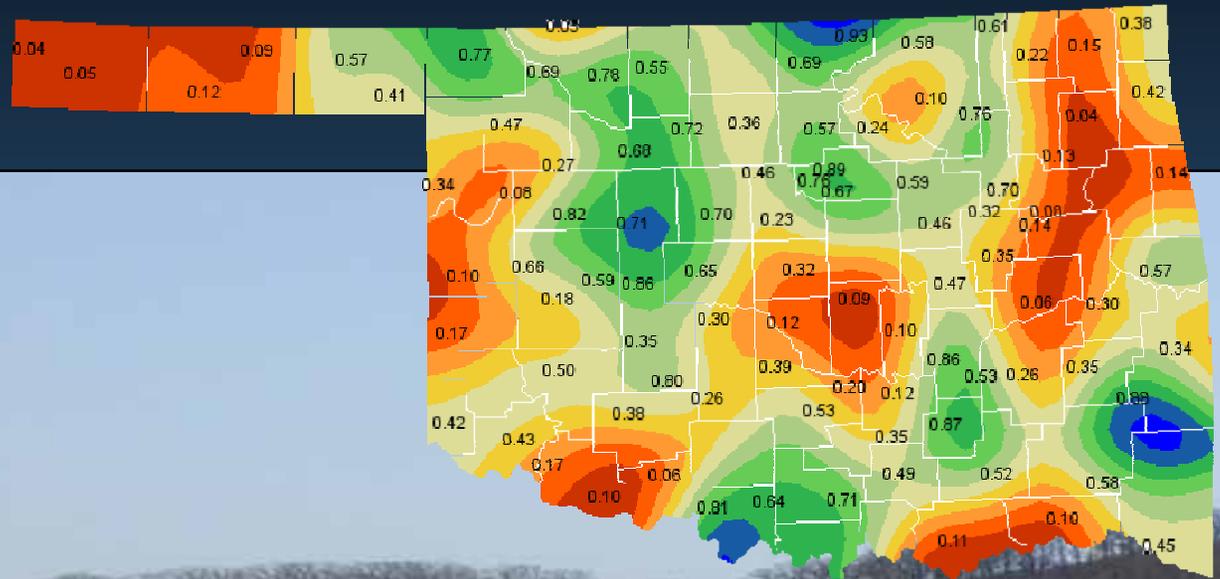
State/Federal Drought Response

- During drought, Corps reports daily water conditions to ODOT (Waterways) and OWRB:
 - ◆ OWRB coordinates with permit holders on critical flow conditions and authority to divert water (priority in time).
 - ◆ OWRB coordinates with permit holders if releases made for navigation to prevent diversion.
- Extreme drought conditions may prompt special requirements:
 - ◆ Federal and/or State Emergency Drought Declarations.

State/Federal Drought Response

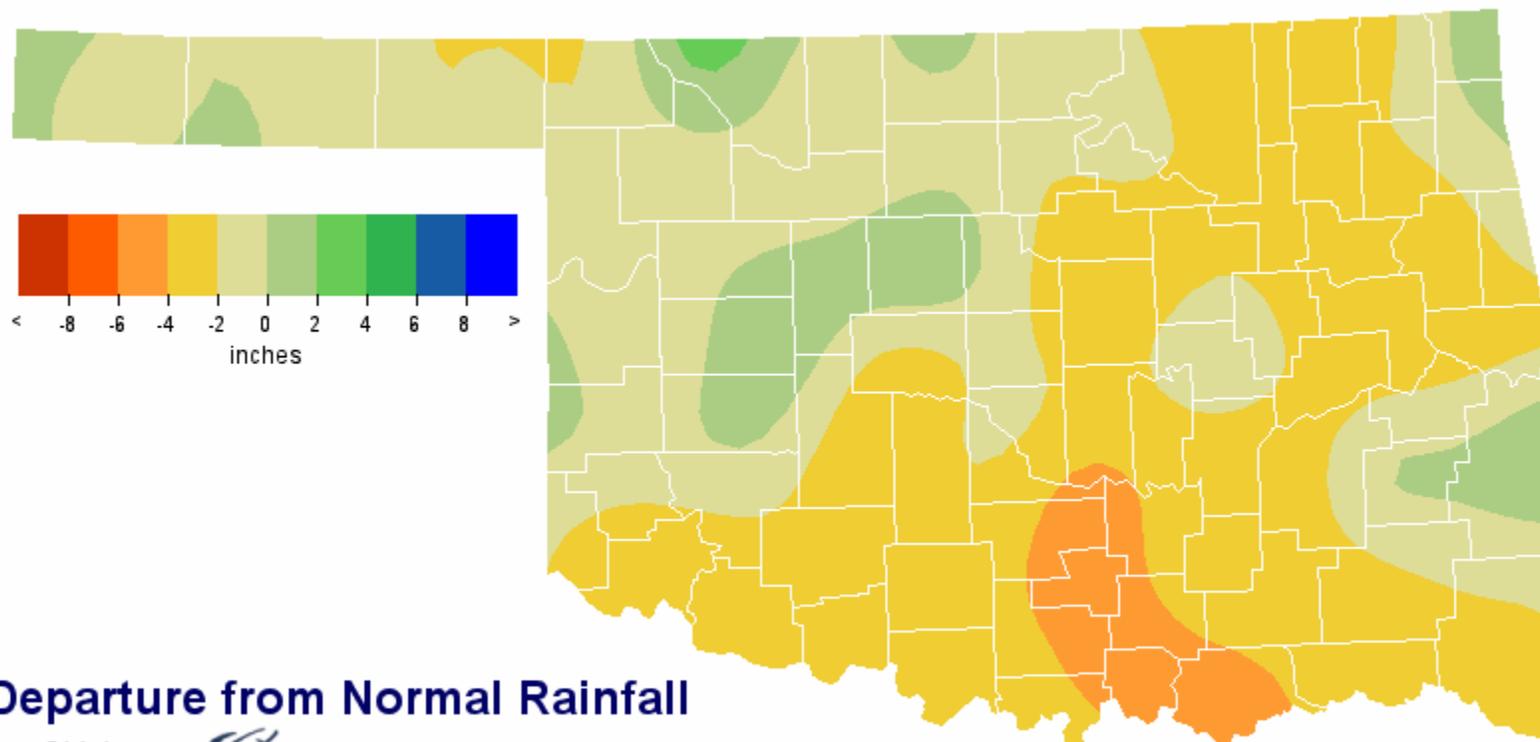
*Drought response is about
everyone working together
to minimize impacts as much as possible
to all beneficial users.*

Current Drought/Moisture Situation in Oklahoma



Departure from Normal Rainfall

May 24-June 22, 2006



Departure from Normal Rainfall

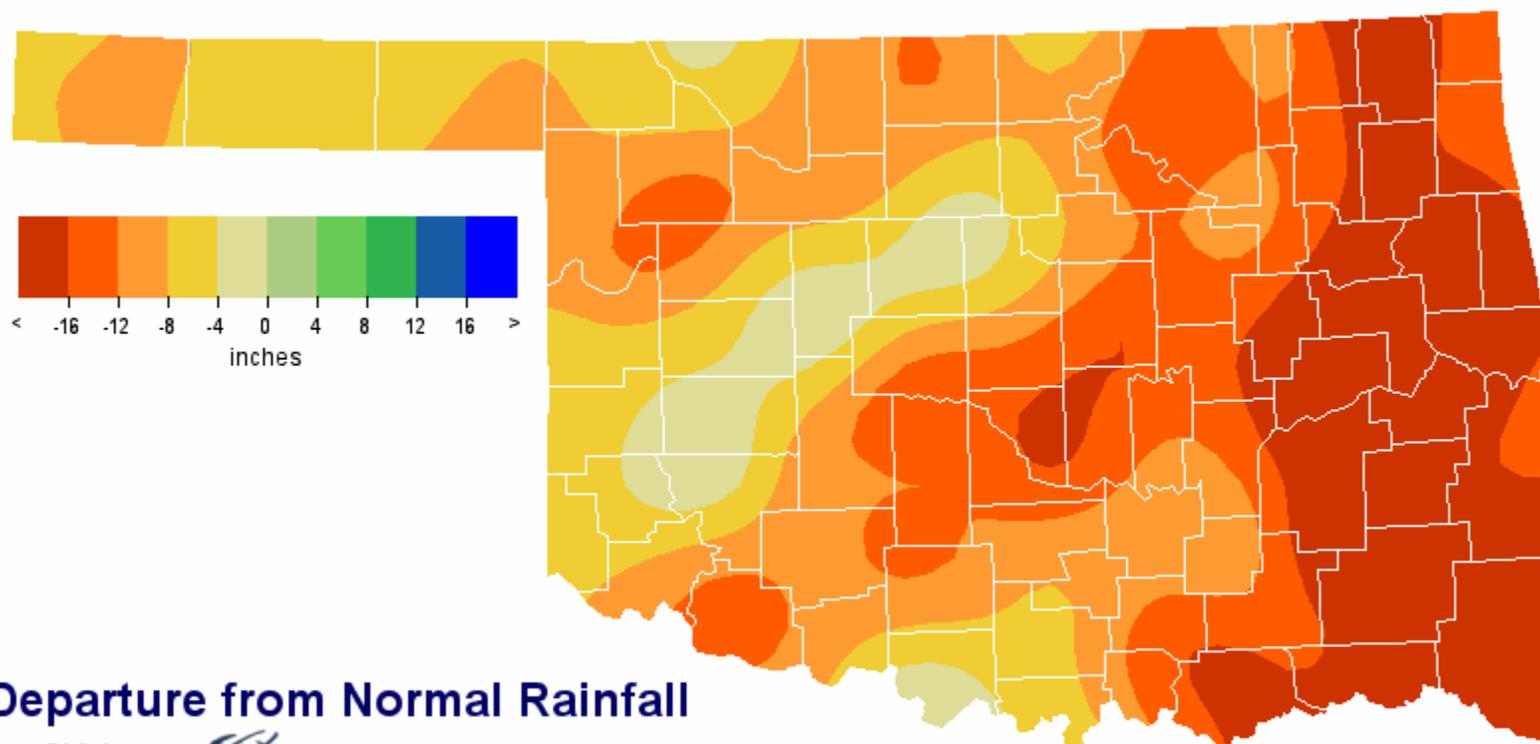


Last 30 Days
May 24, 2006 through Jun 22, 2006

Copyright (c) 2006 Oklahoma Climatological Survey.
All rights reserved. Rainfall data collected by Oklahoma Mesonet.
image created 05:34 CDT Jun 23, 2006

Departure from Normal Rainfall

Last 365 Days



Departure from Normal Rainfall



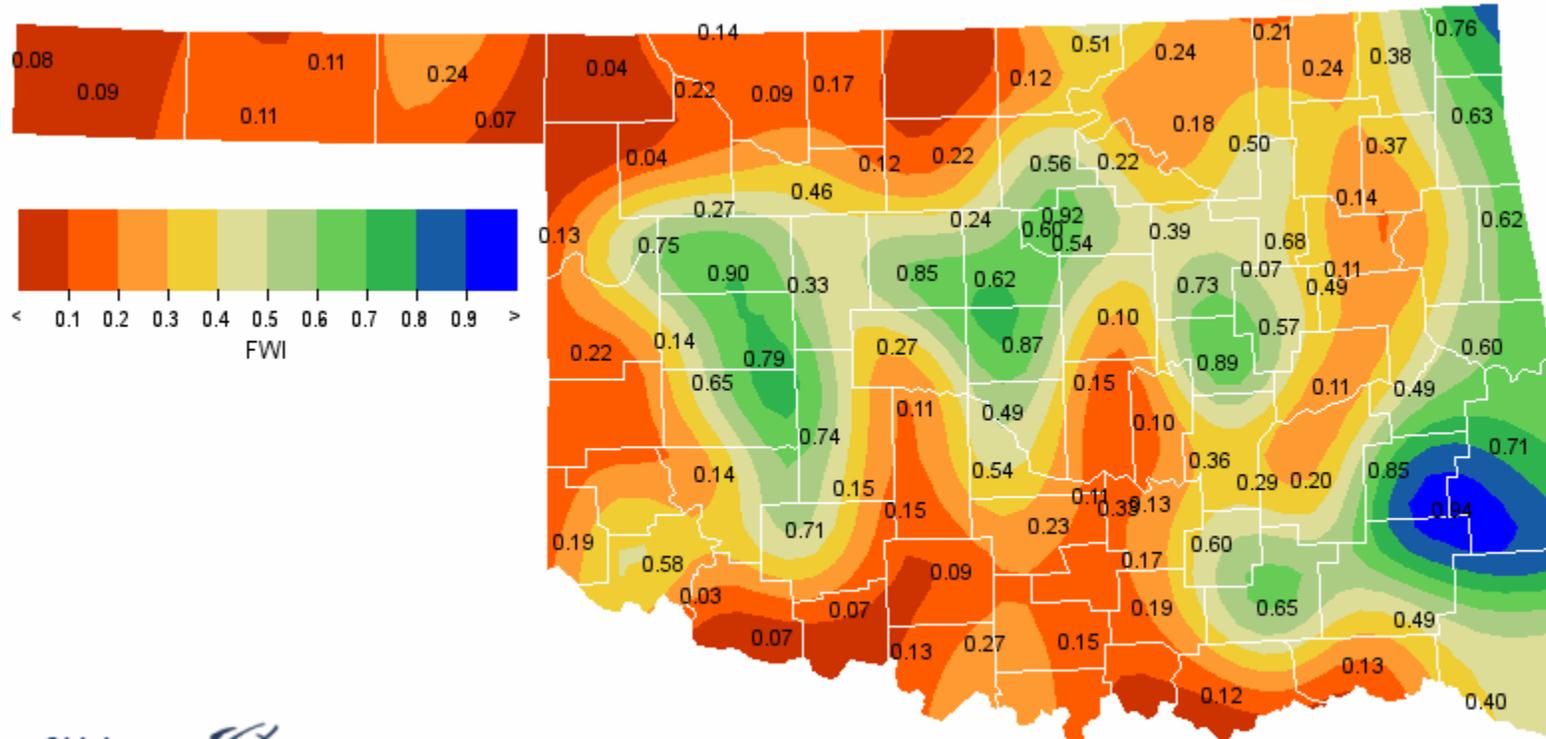
Last 365 Days
Jun 23, 2005 through Jun 22, 2006

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All rights reserved. Rainfall data collected by Oklahoma Mesonet.
image created 05:53 CDT Jun 23, 2006

Current Soil Moisture (OCS)

June 22, 2006

25 cm (~ 10 inches)

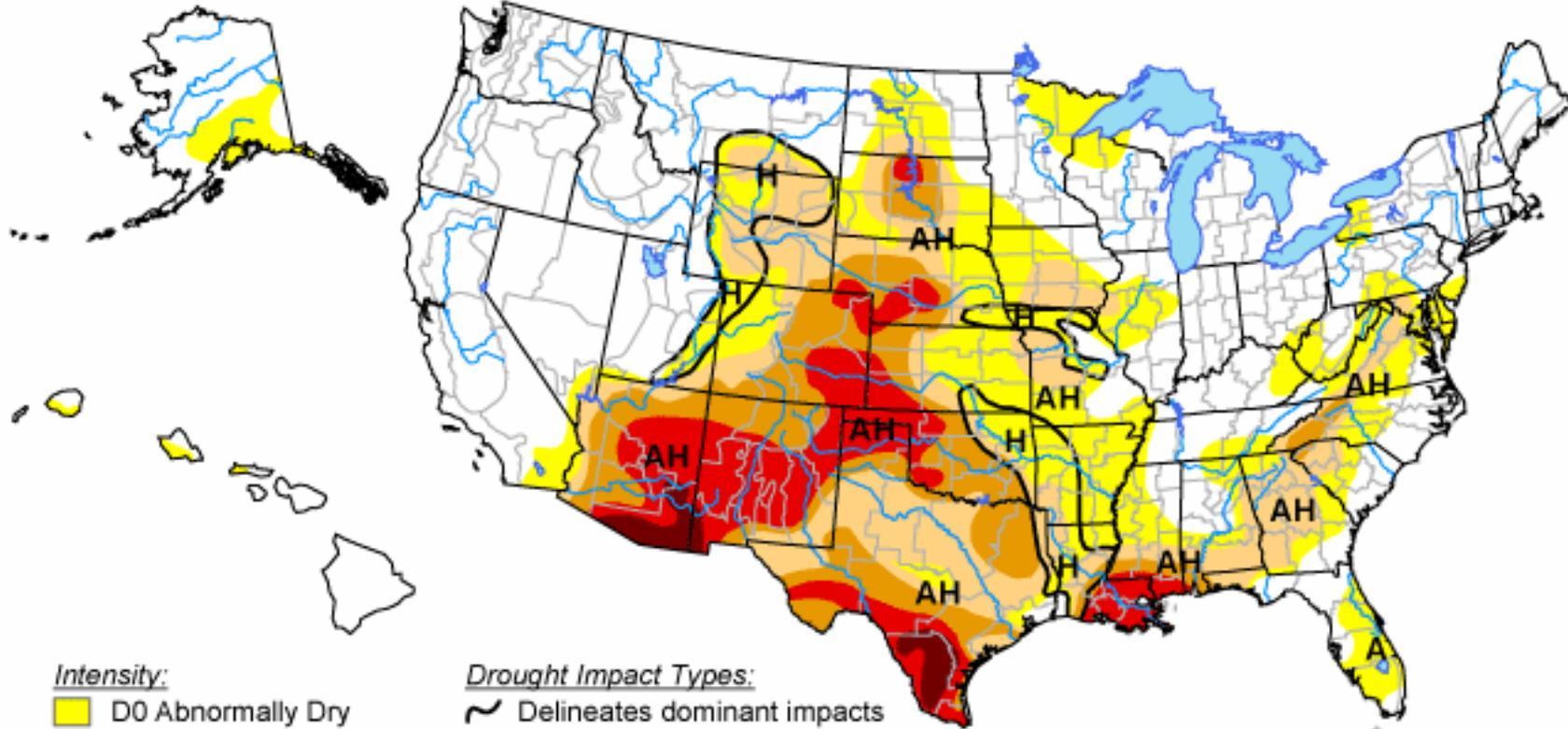


25-cm Fractional Water Index
as of Jun 22, 2006

Copyright (c) 2006 Oklahoma Climatological Survey. All rights reserved.
image created 05:00 CDT Jun 23, 2006

U.S. Drought Monitor

June 20, 2006
Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>

Author:

U.S. Drought Monitor:

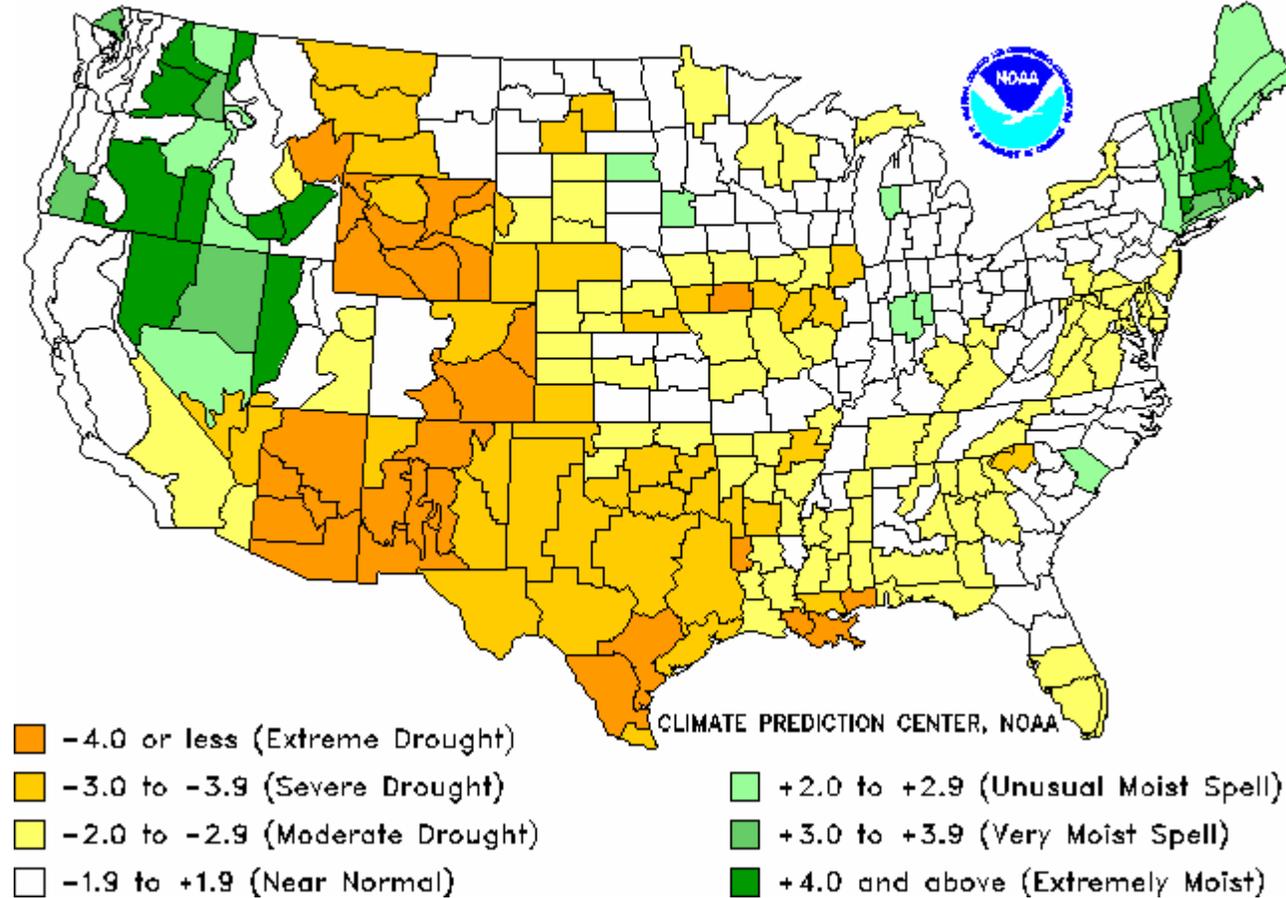
- a service maintained by the University of Nebraska (Lincoln);
- utilizes numerous state and federal weather-related sources;
- Oklahoma: "abnormally dry" to "extreme drought" conditions

Palmer Drought Severity Index

Drought Severity Index by Division

Weekly Value for Period Ending 17 JUN 2006

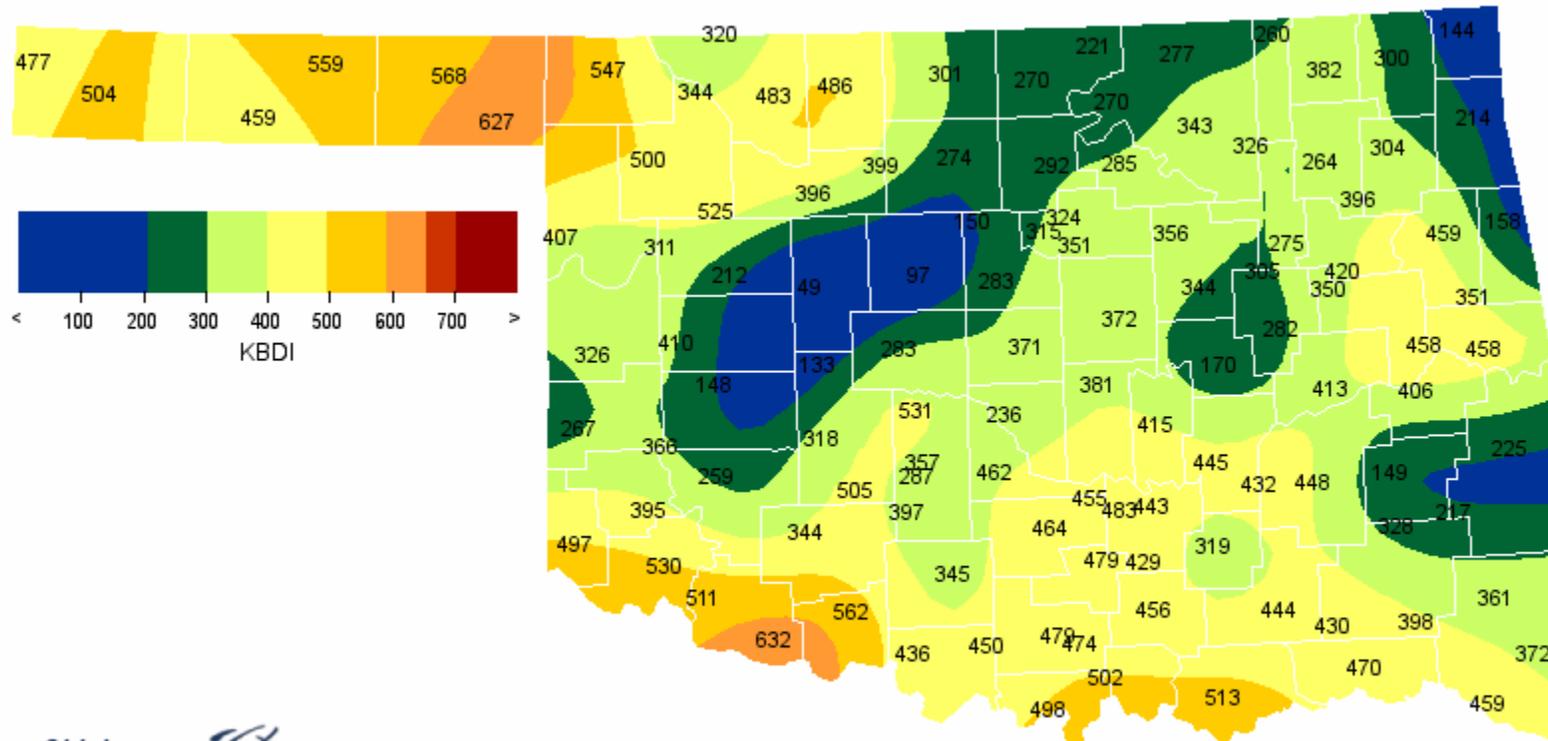
Long Term Palmer



As of June 17, 2006:

- 6 state climate divisions are experiencing at least "severe" drought conditions

Keetch-Byram Drought Index

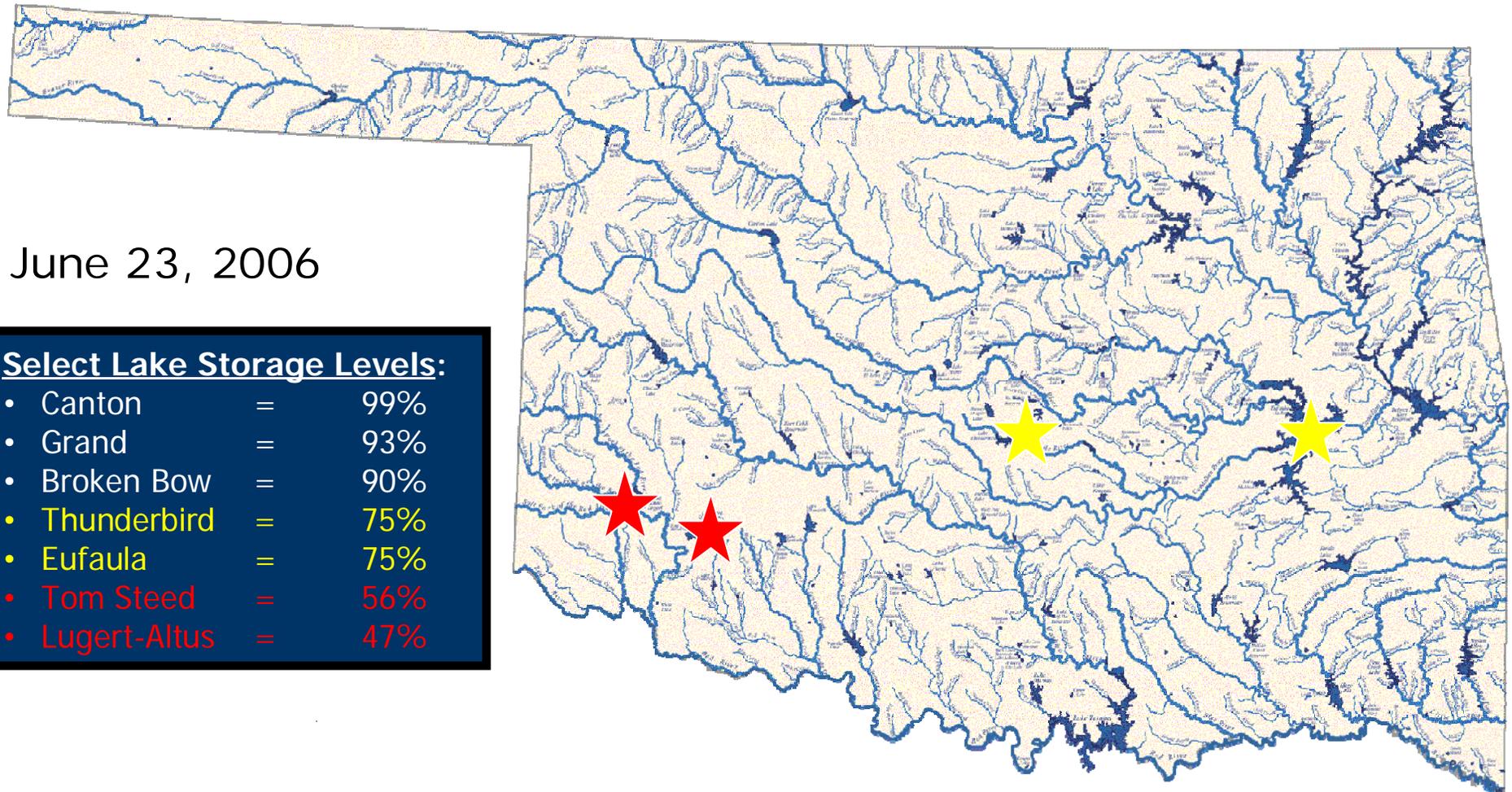


Keetch-Byram Drought Index
as of Jun 22, 2006

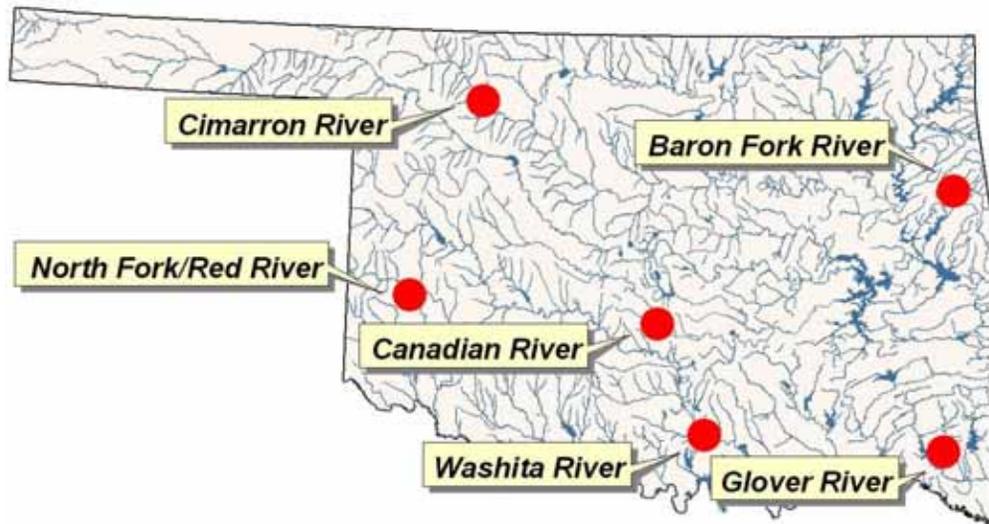
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image created 05:00 CDT Jun 23, 2006

- Drought-related fire conditions remain of concern throughout much of Oklahoma.

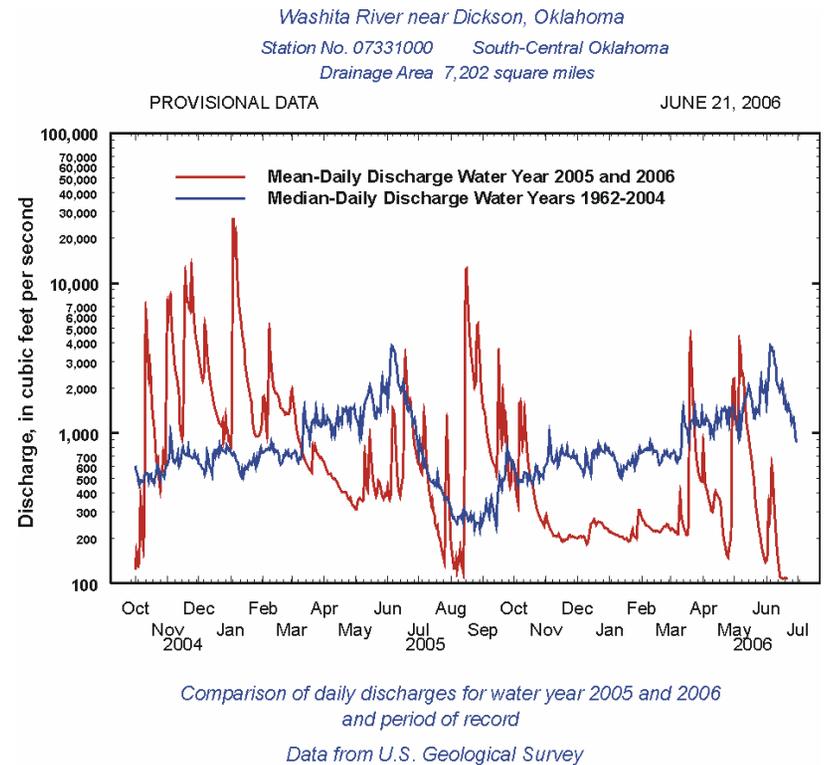
Reservoir Storage in Major State Lakes



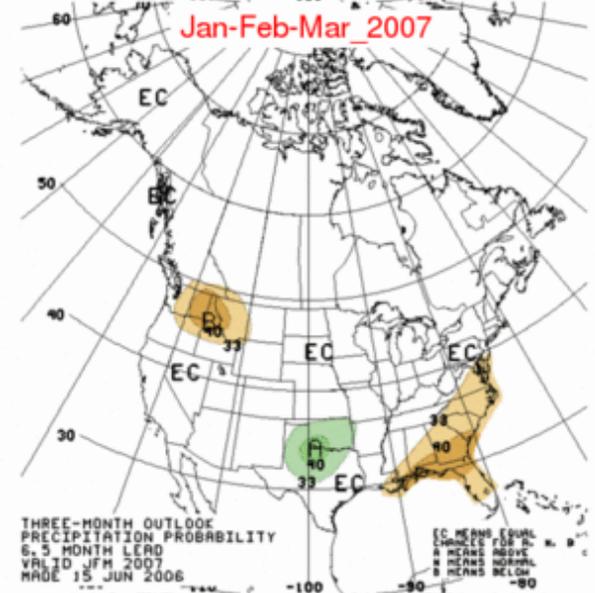
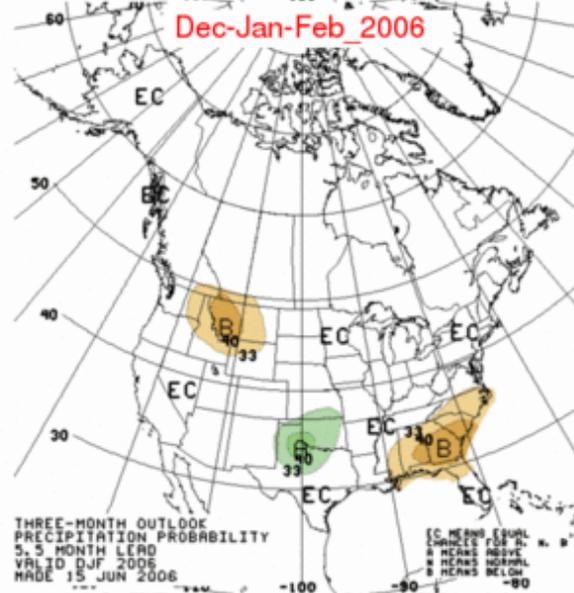
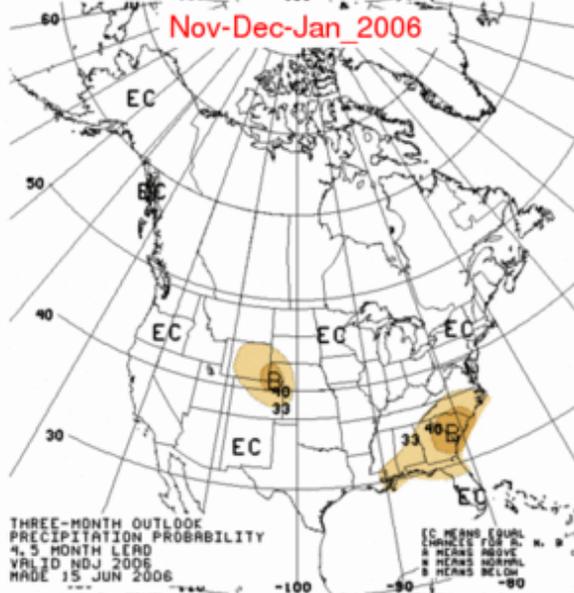
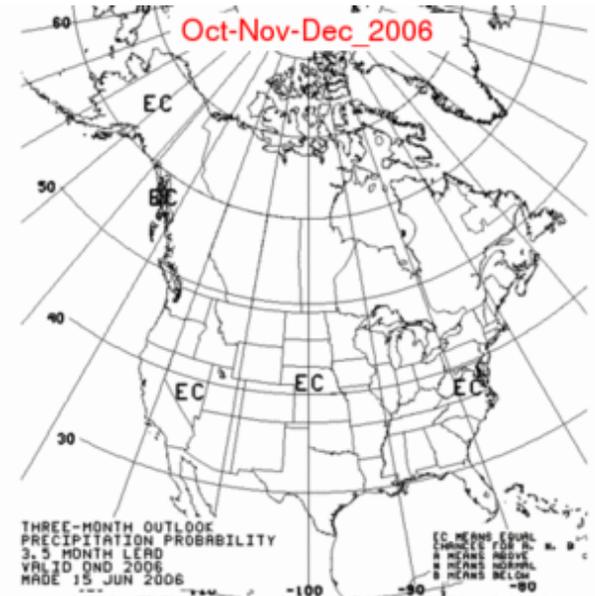
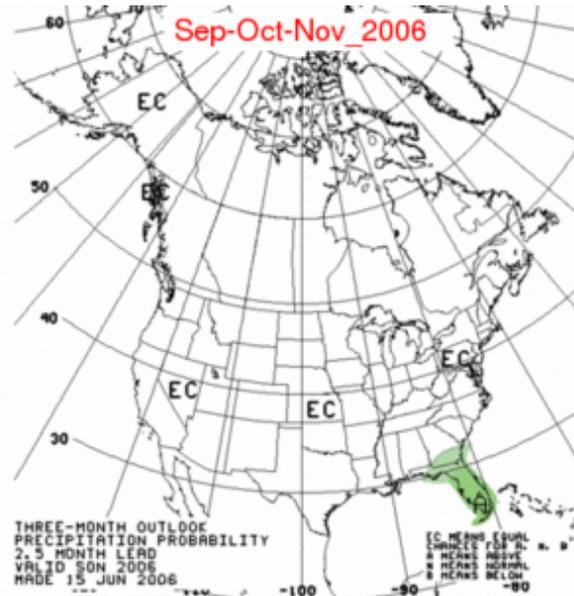
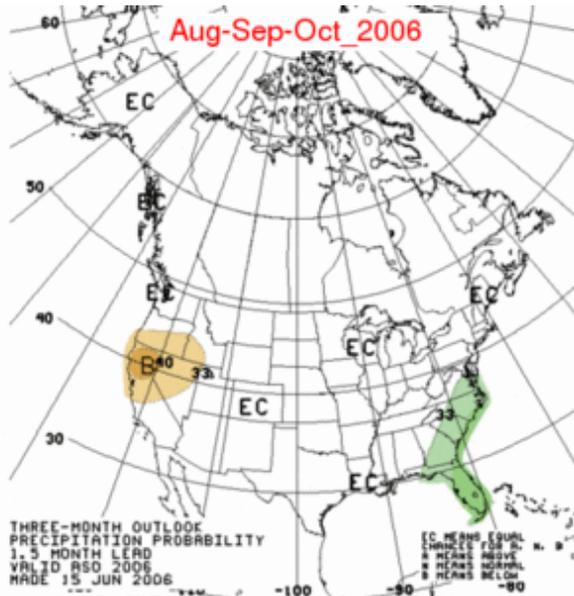
Streamflow Conditions



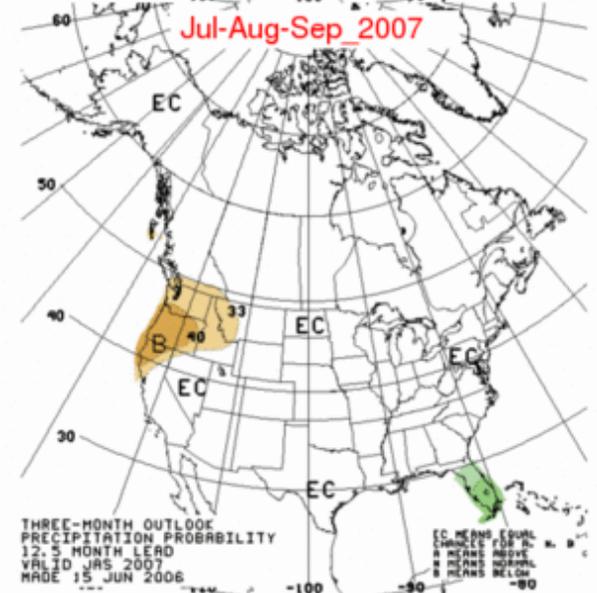
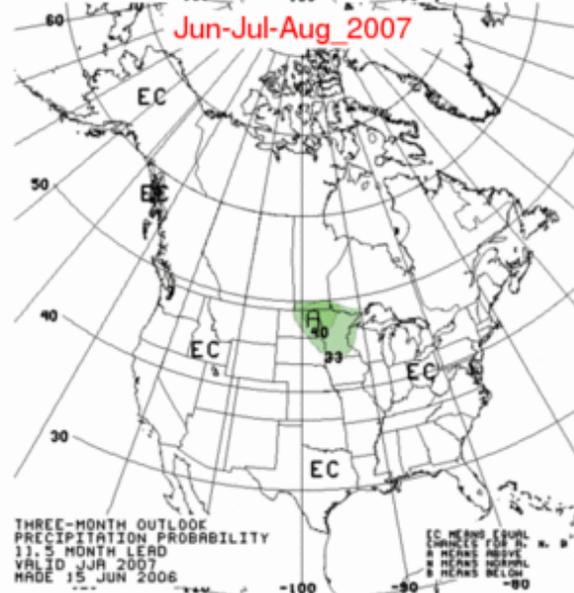
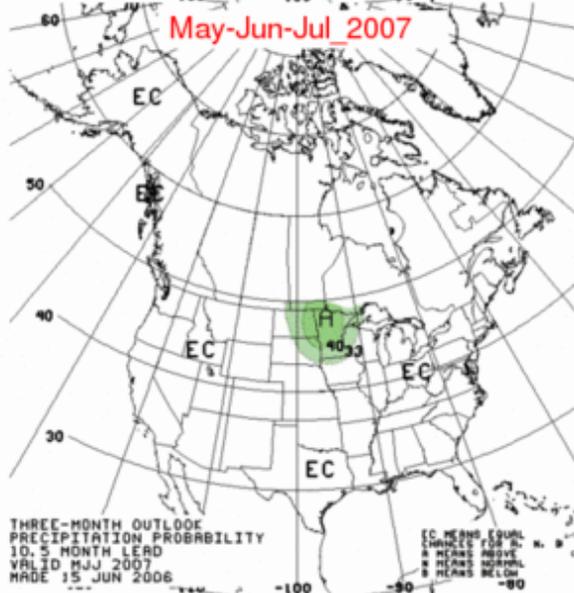
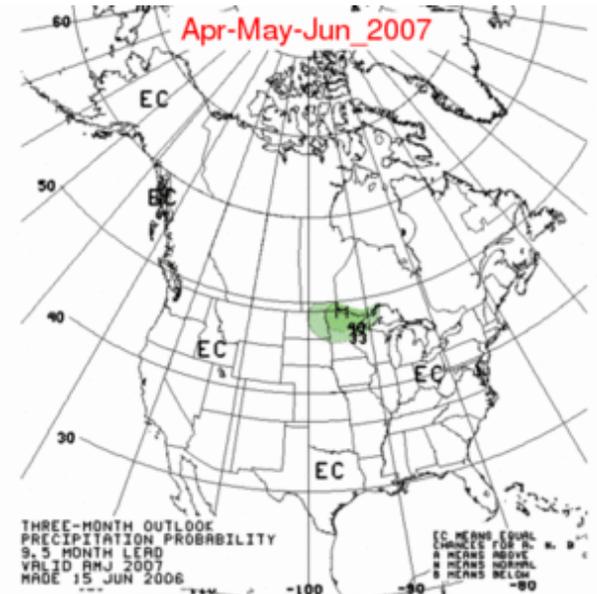
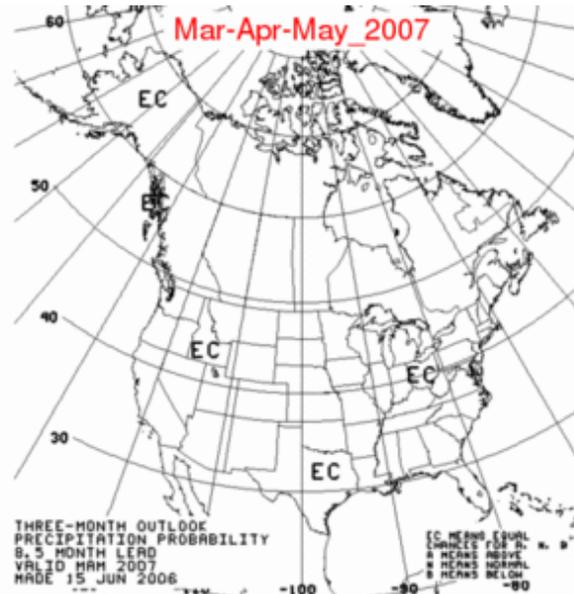
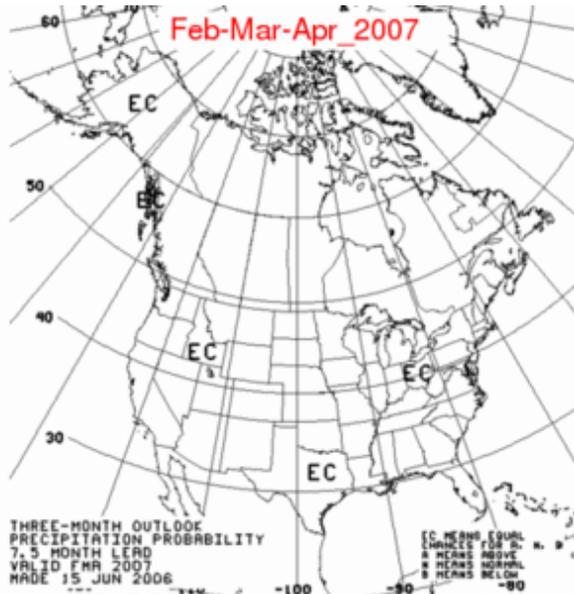
- Streamflows are generally below normal throughout much of Oklahoma.

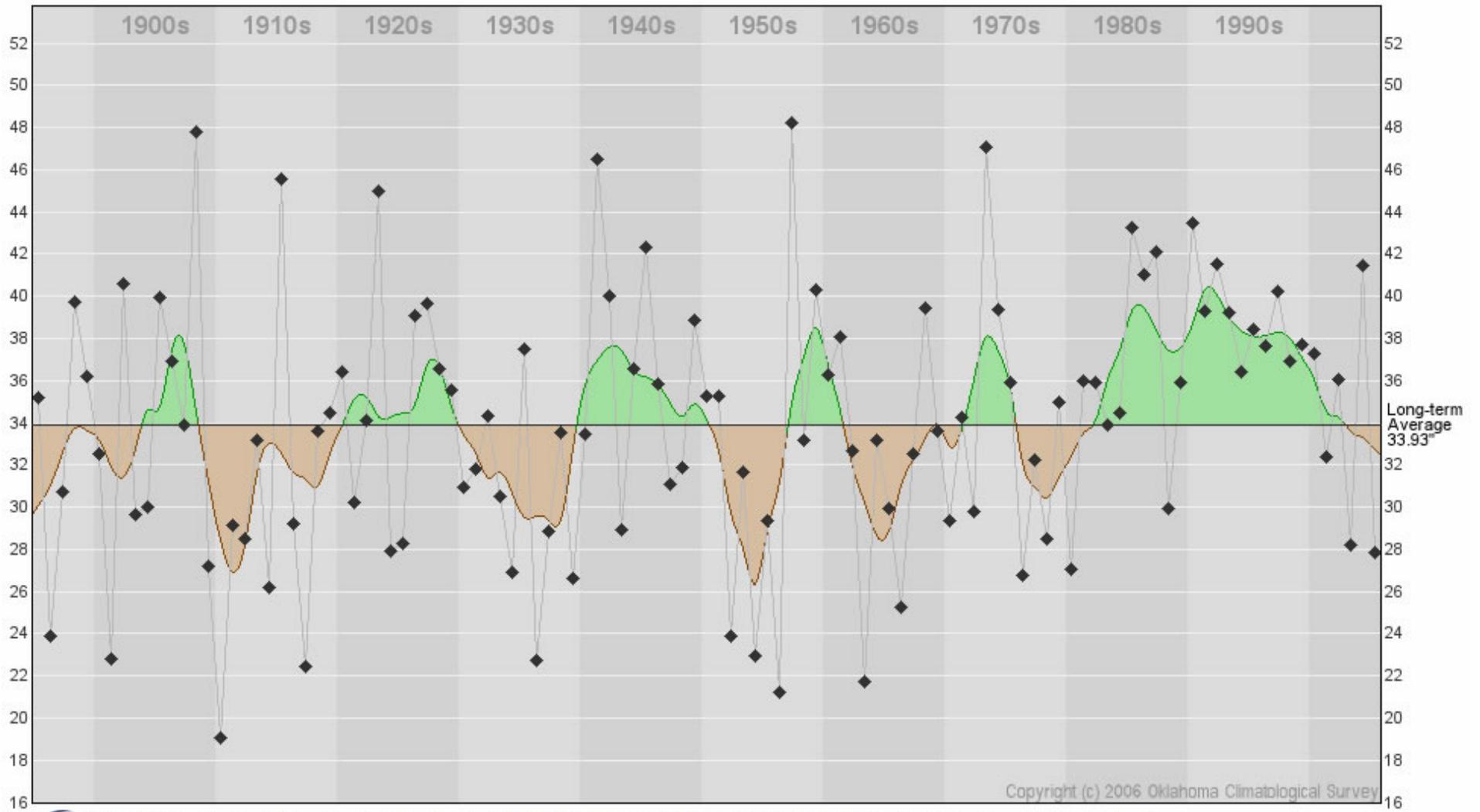


Long-Term Precipitation Forecast



Long-Term Precipitation Forecast





Annual Rainfall History with 5-yr Weighted Trends
 Climate Division 10 (Statewide): 1895-2005

- Wetter historical periods
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OWRB

the water agency