Tennessee's Water Challenges

Balancing Resources and Needs

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Tennessee's Water Resources

Having It All~

~Where you need it

~When you need it

~of the Quality you need

~in the Quantity you need

Stored Water vs. Natural Water Droughts

- ***Stored water droughts*** *occur when large stores of water in man-made reservoirs, natural lakes, and groundwater aquifers depleted by very long, unusually low periods of precipitation.*
- ***Natural water droughts*** *quickly and fairly frequently follow just a few weeks or months of below-normal rainfall.*

Source: National Drought Policy Commission Report (2000).

How Stored Water Droughts Happen

- People without enough stored water build reservoirs or tap into surface (natural lakes and streams) or groundwater (aquifers) storage.
- Reliable water supports population growth and more diverse water uses:
  - *Hydro-power dams create popular fishing and boating lakes and valuable lake view property.*
  - *Reservoir operating policies ensure minimum flows for fish and wastewater dilution when there would not otherwise be enough water in the stream.*
  - *Cities and farmers increase their withdrawals as they prosper and grow.*

Source: National Drought Policy Commission Report (2000).

Lake Sidney Lanier, Georgia

http://www.greatlakesofgeorgia.com/lanier/

How Stored Water Droughts Happen

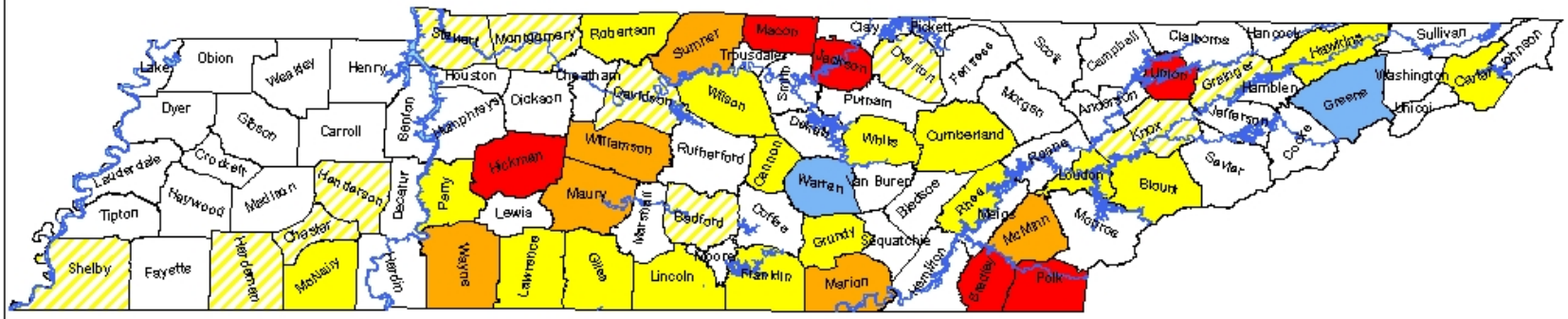
- An unusually long dry period forces reservoir operators to draw down man-made lakes to
  - support withdrawals for cities and farms,
  - produce hydropower,
  - and keep enough water in navigation channels for barges to float.
- But
  - homes and businesses around the lake now have views of mud flats,
  - boat ramps no longer reach the water, and
  - lake fisheries suffer when releases are made for riverine species.

Source: National Drought Policy Commission Report (2000).

Drought and Growth Strike Lake Sidney Lanier

The Buford Dam impounds Lake Lanier in northern Georgia. (Photo courtesy U.S. Army Corps of Engineers)

Tennessee Counties in Which Water has Been Restricted or Required to have Additional Treatment as of September 21, 2007



Legend

- No Restrictions or Addtional Treatment
- Mandatory Restrictions
- Voluntary Restrictions
- Voluntary Restrictions (from News Article)
- Madatory and Voluntary Restrictions
- Additional Treatment

Source: Tennessee Emergency Management Agency and News Articles from around Tennessee

Note: Restrictions and treatment requirements are not county wide as depicted by county level shading.

TACIR

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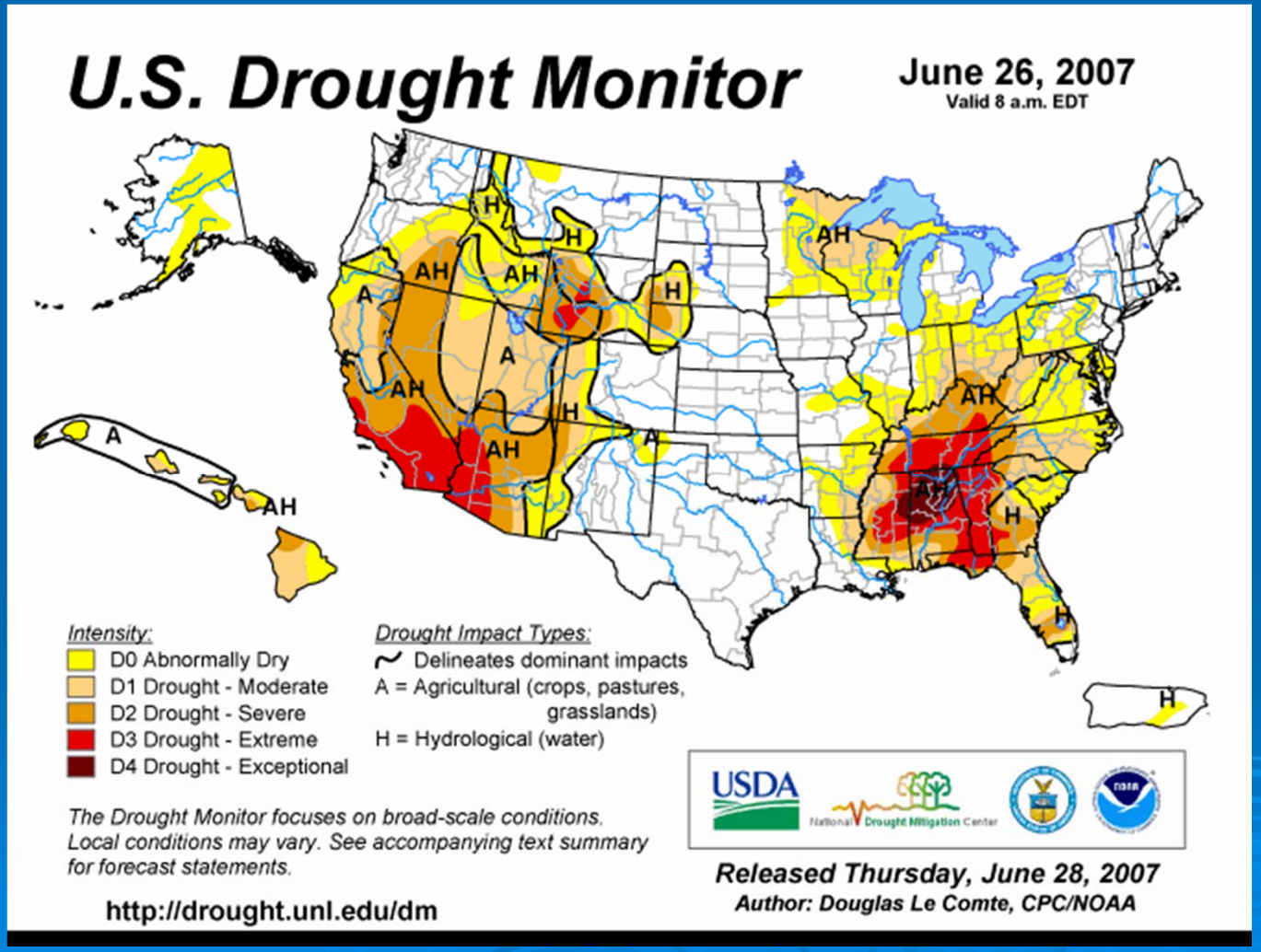
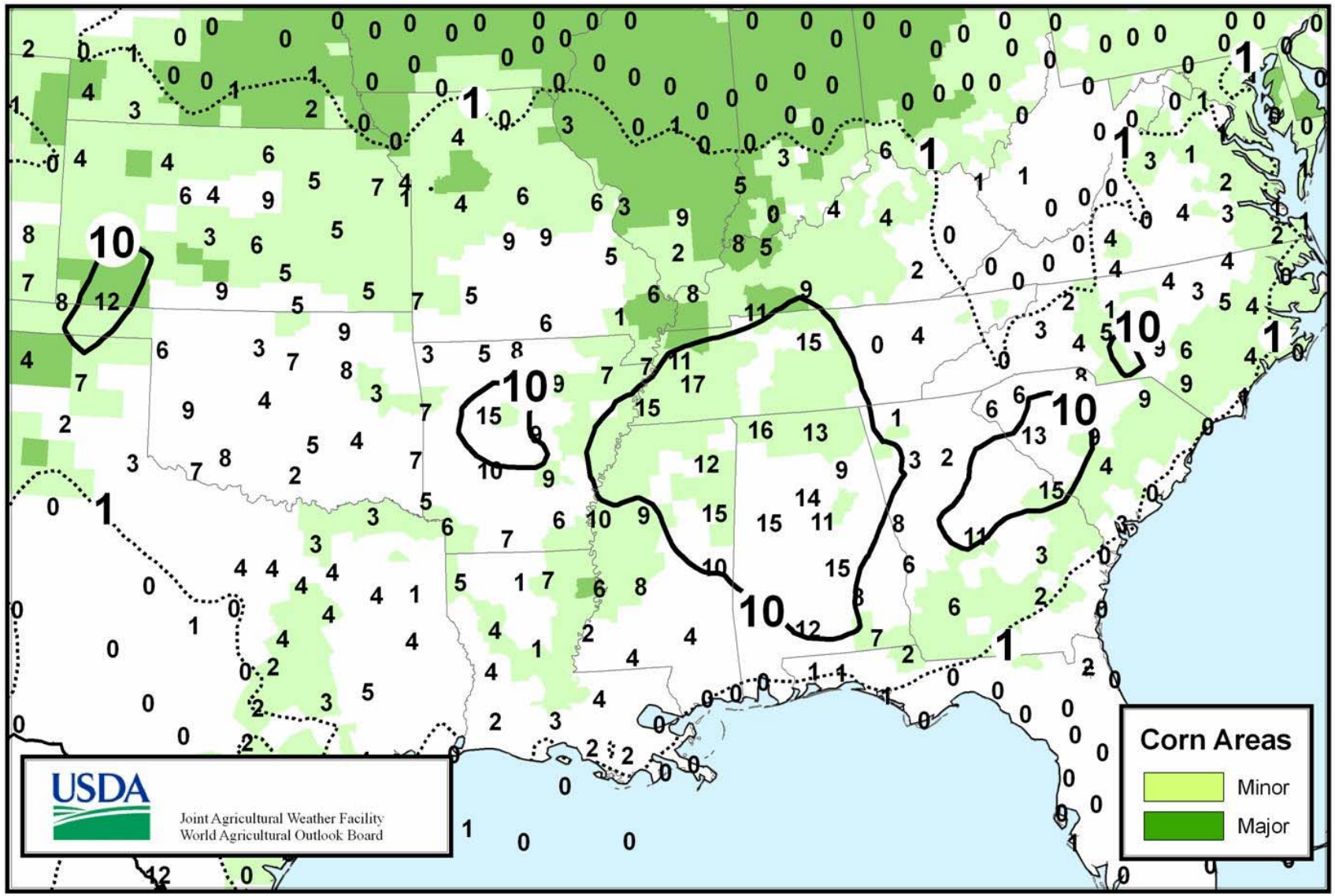
0 25 50 100 150 200 Miles

Where & When You Want It?

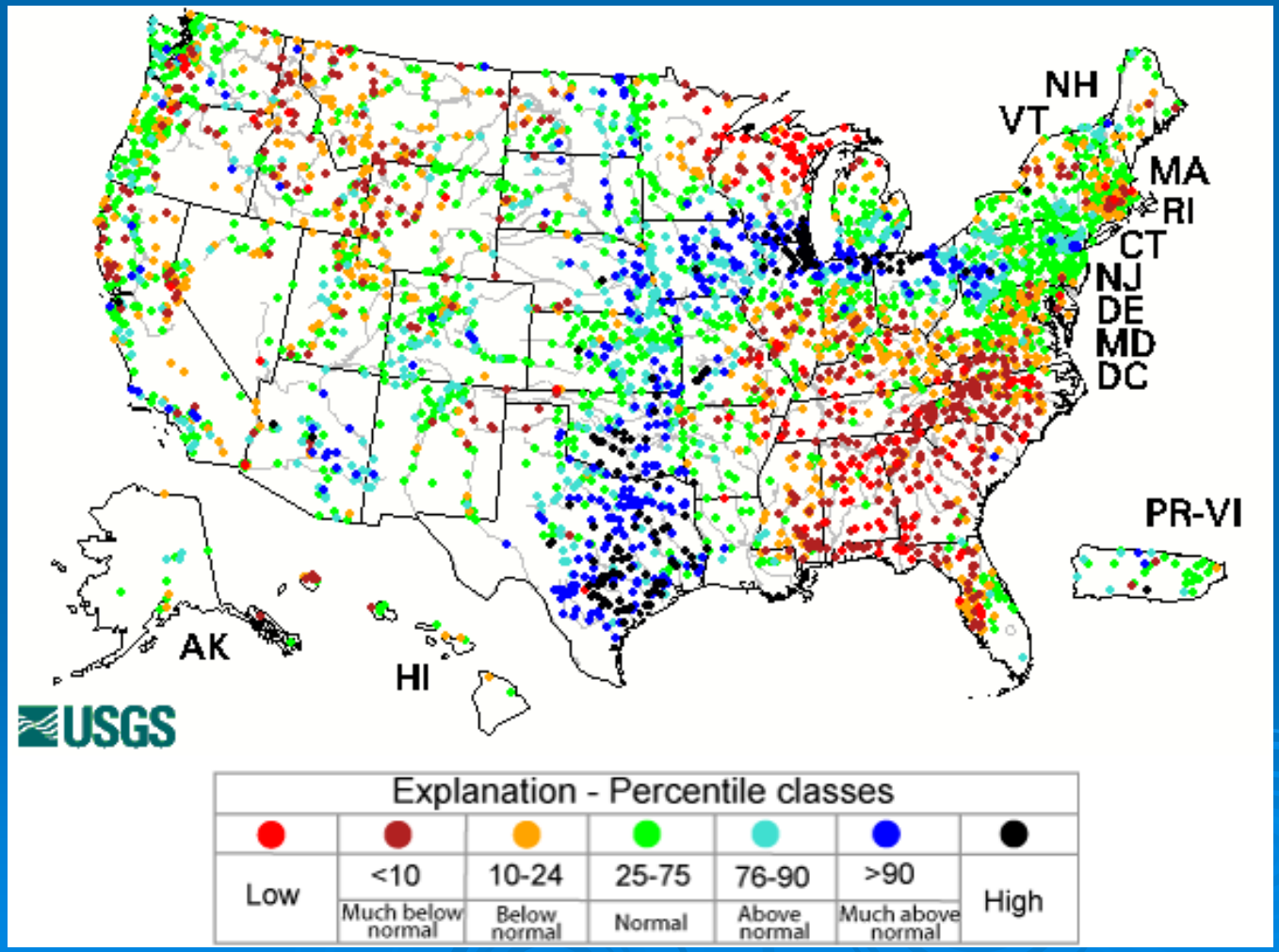


Number of Days 100°F or Greater

August 1-27, 2007

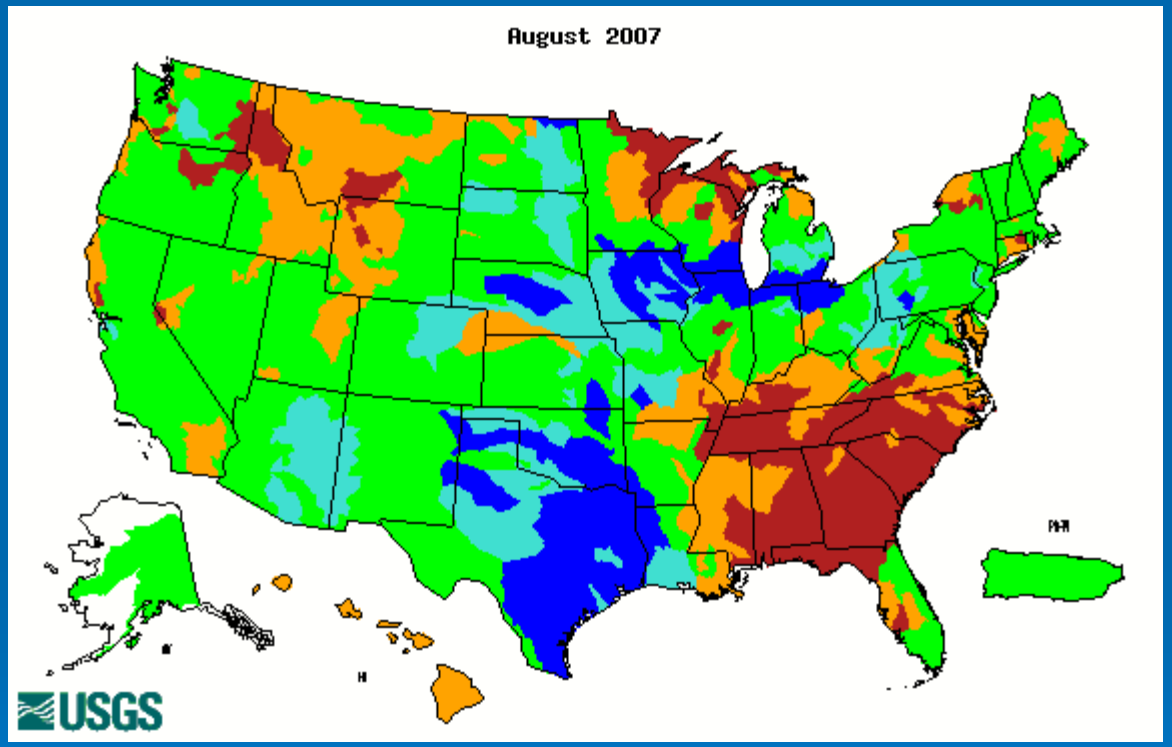


Average Stream Flow during *August 1-27, 2007*



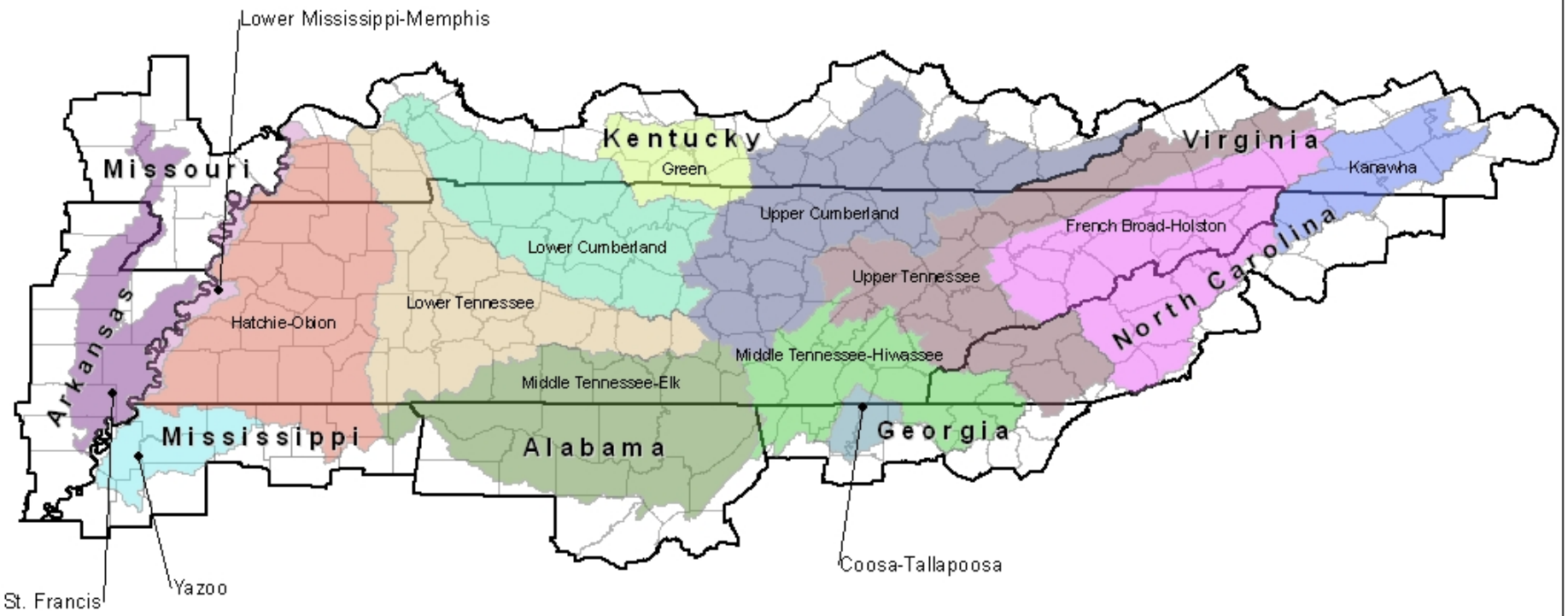
Where & When You Want It?

Monthly Average Stream Flow



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Tennessee's Water Basins and Sharing States



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0 35 70 140 210 280
Miles

Water Disputes in the Southeast and Their Impact on Tennessee

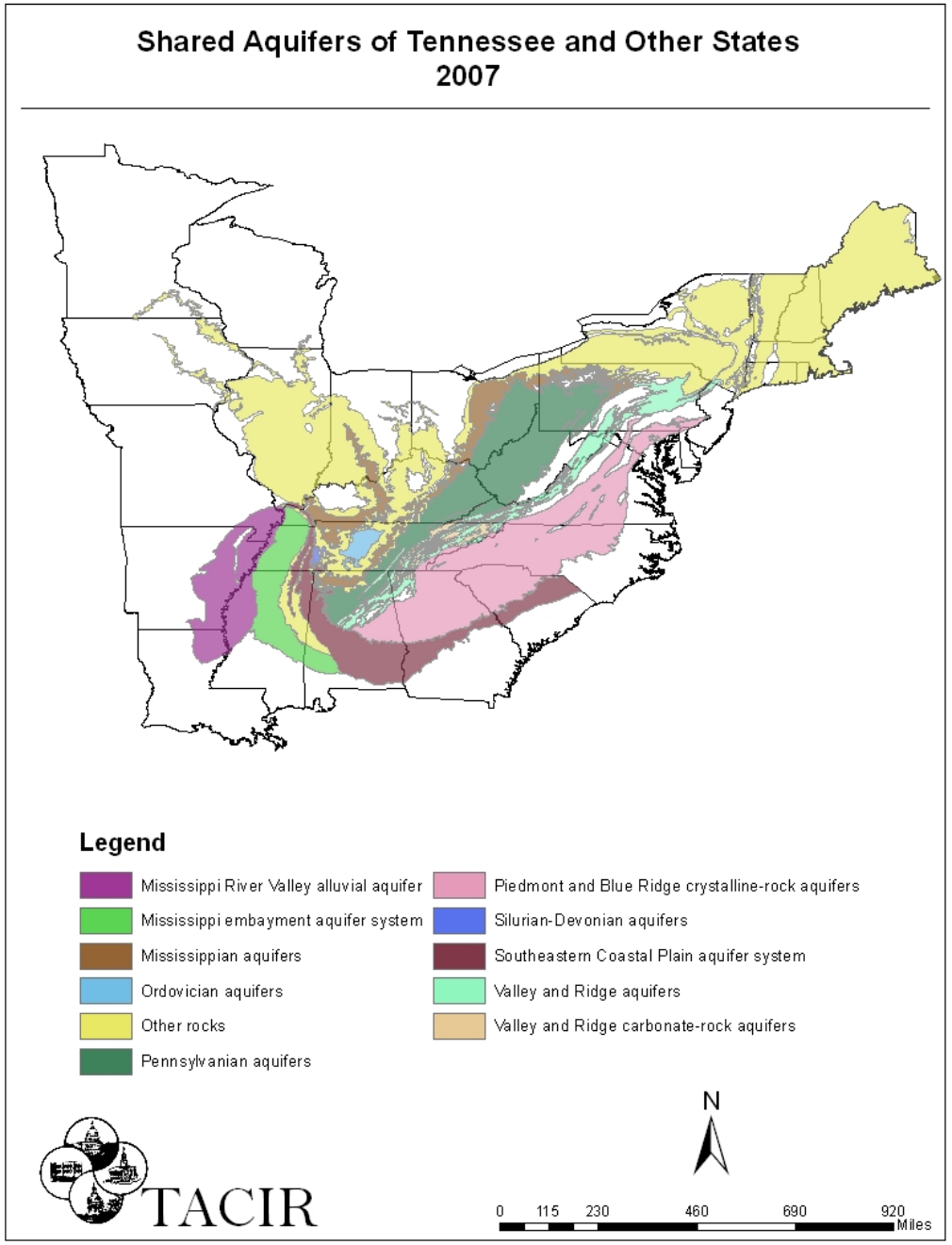
- *Growing competition by different users over the same surface and groundwater supplies is increasingly taking the form of "up" versus "downstream" use and dependence on water supply sources that extend over several jurisdictions and even states*.
- *Land use changes, population growth, rapid urbanization, and regional climate variation are imposing new, largely unanticipated pressures on the region's water and reveal the impossibility of separating, and discretely managing, water supply and water quality.*
- *Protecting local water supplies and keeping them safe, clean, and available—while promoting economic growth—are proving to be difficult-to-reconcile goals in rapidly growing metropolitan areas and smaller communities that seek to broaden their tax base and economically diversify.*

Source: Research Needs for Protecting Tennessee's Water Supply: A Baseline for Continued Policy Development (Feldman & Albertson 2003).

Memphis and its Light, Gas & Water Division have been sued by the state of Mississippi. The lawsuit was filed in the U.S. Federal District in Oxford in February 2005. (The trial has been rescheduled for early next year according to the Commercial Appeal.)

Mississippi claims that one-third of the water Memphis pumps—about 60 million gallons a day—comes from south of the state line. This water is "unreasonably and unlawfully diverted," causing harm to the aquifer, it says.

Source: *U.S. Water News Online*.



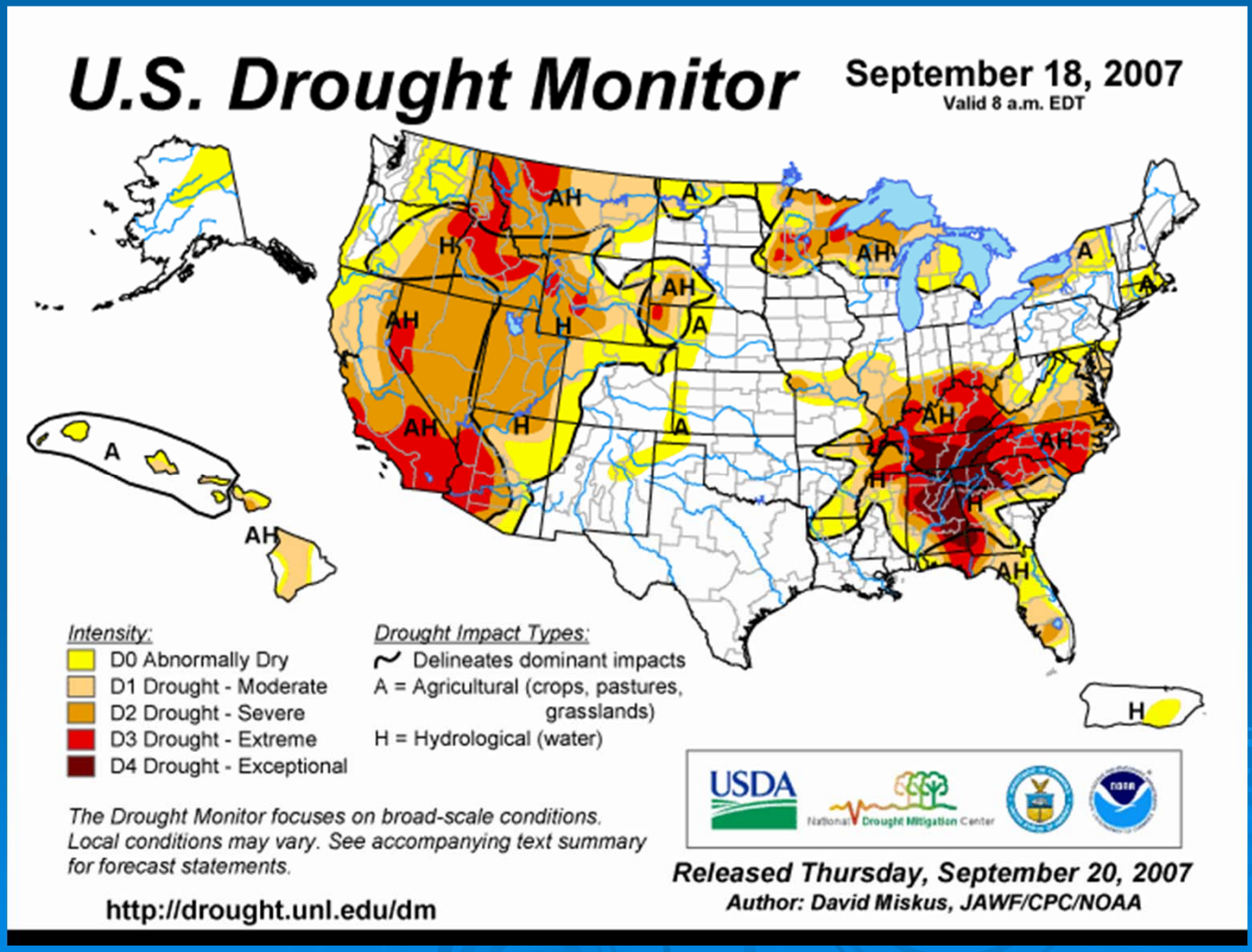
Normandy Dam

TVA's Duck River "Balancing Act"

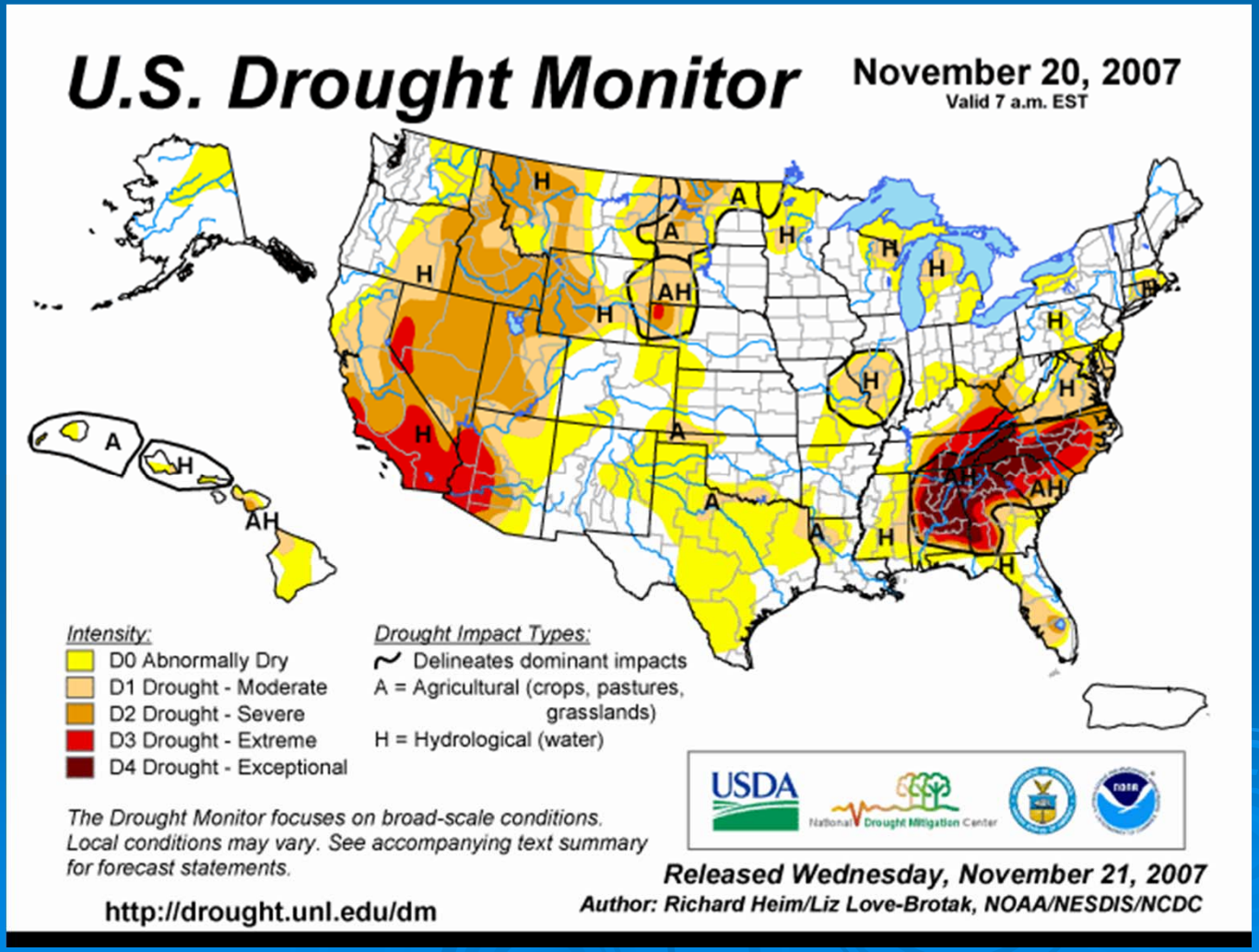
Normandy Reservoir is located on the Duck River in south central Tennessee. The 17-mile-long reservoir was completed in the 1970s to aid in the economic development of the upper Duck River region.

Source: TVA, http://www.tva.gov/sites/normandy.htm.

Where & When You Want It? Part Deux



Where & When You Want It?
Winter Reprieve?

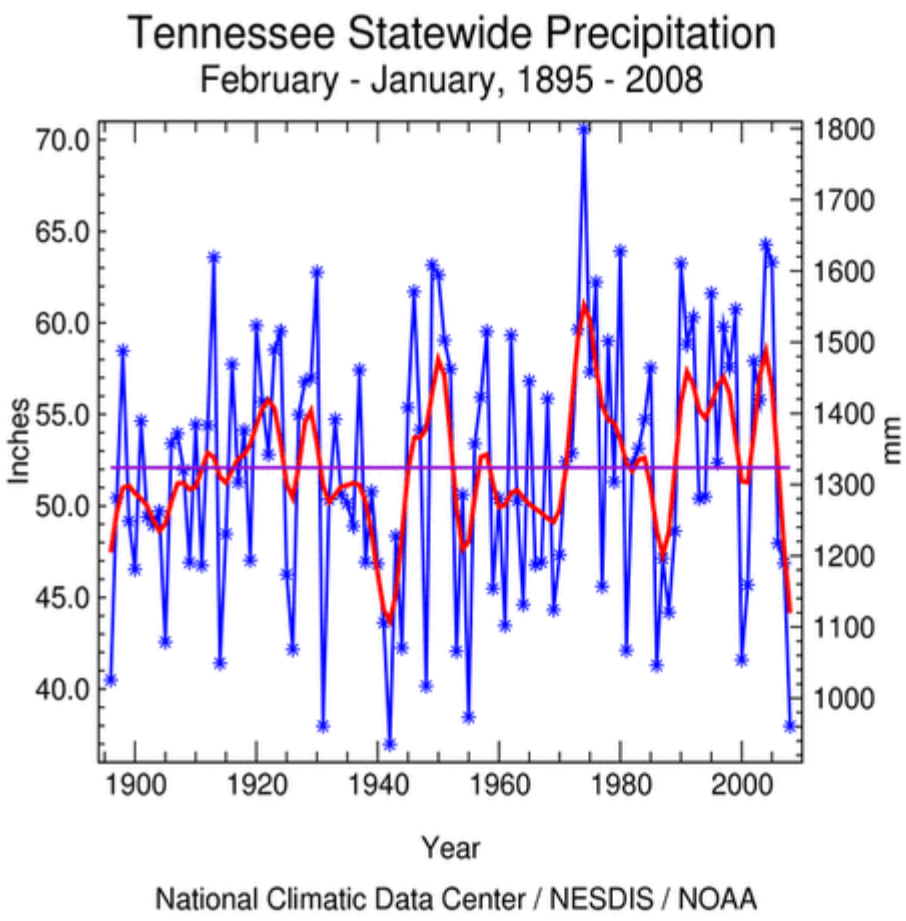


Statewide Precipitation Ranks for Tennessee, 2007-2008

Period	Rank
Jan	45th driest
Dec-Jan	41st driest
Nov-Jan	38th driest
Oct-Jan	53rd wettest, (61st driest)
Sep-Jan	52nd driest
Aug-Jan	35th driest
Jul-Jan	30th driest
Jun-Jan	25th driest
May-Jan	14th driest
Apr-Jan	13th driest
Mar-Jan	3rd driest
Feb-Jan	2nd driest

Source: National Climatic Data Center/NESDIS/NOAA.
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/st040dv00pcp.html

When You Need It?



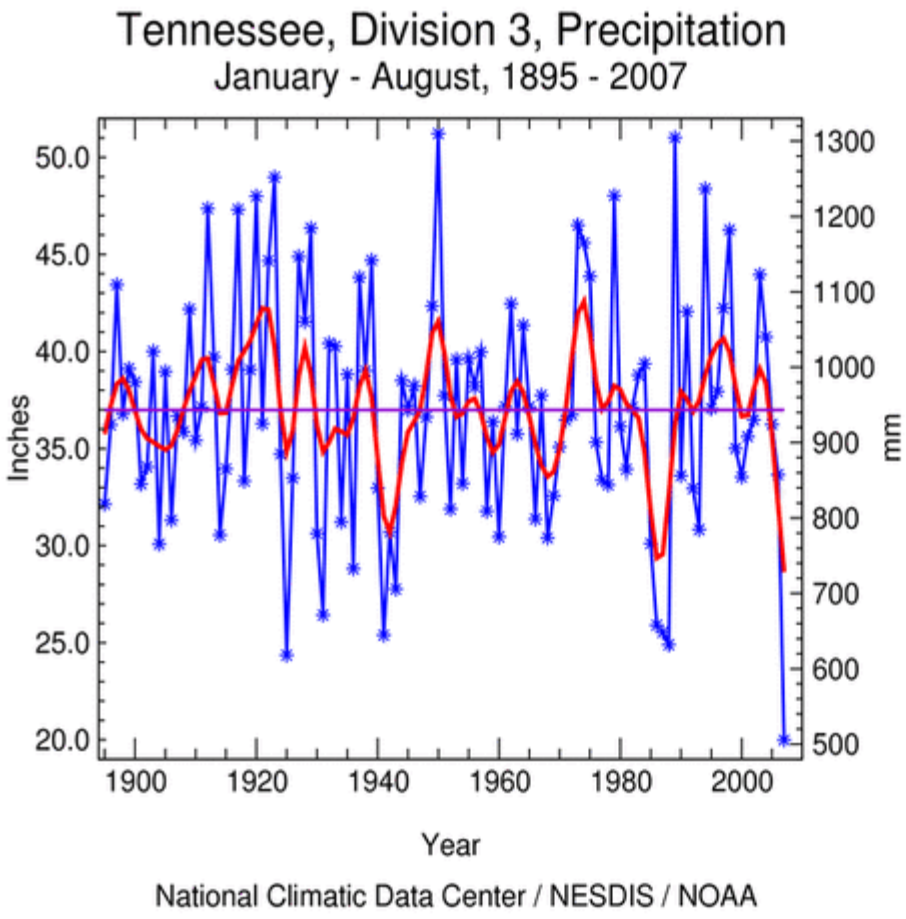
Statewide Precipitation Ranks for Middle Tennessee

Year-to-date, August 2007

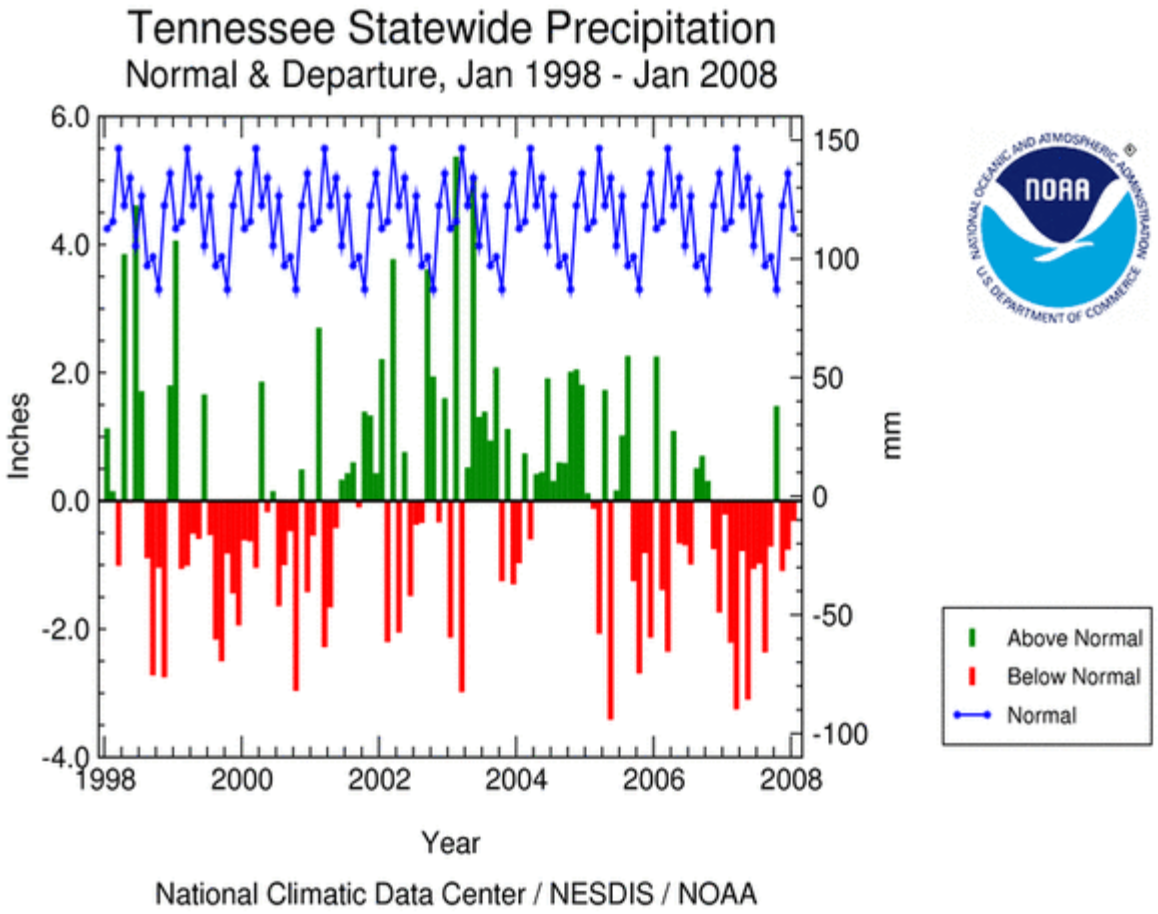
Period	Rank
Aug	2nd driest
Jul-Aug	1st driest
Jun-Aug	1st driest
May-Aug	1st driest
Apr-Aug	1st driest
Mar-Aug	1st driest
Feb-Aug	1st driest
Jan-Aug	1st driest
Dec-Aug	1st driest
Nov-Aug	1st driest
Oct-Aug	1st driest
Sep-Aug	1st driest

Source: National Climatic Data Center/NESDIS/NOAA.
http://www.ncdc.noaa.gov/oa/climate/research/2007/aug/us-drought.html#paleo

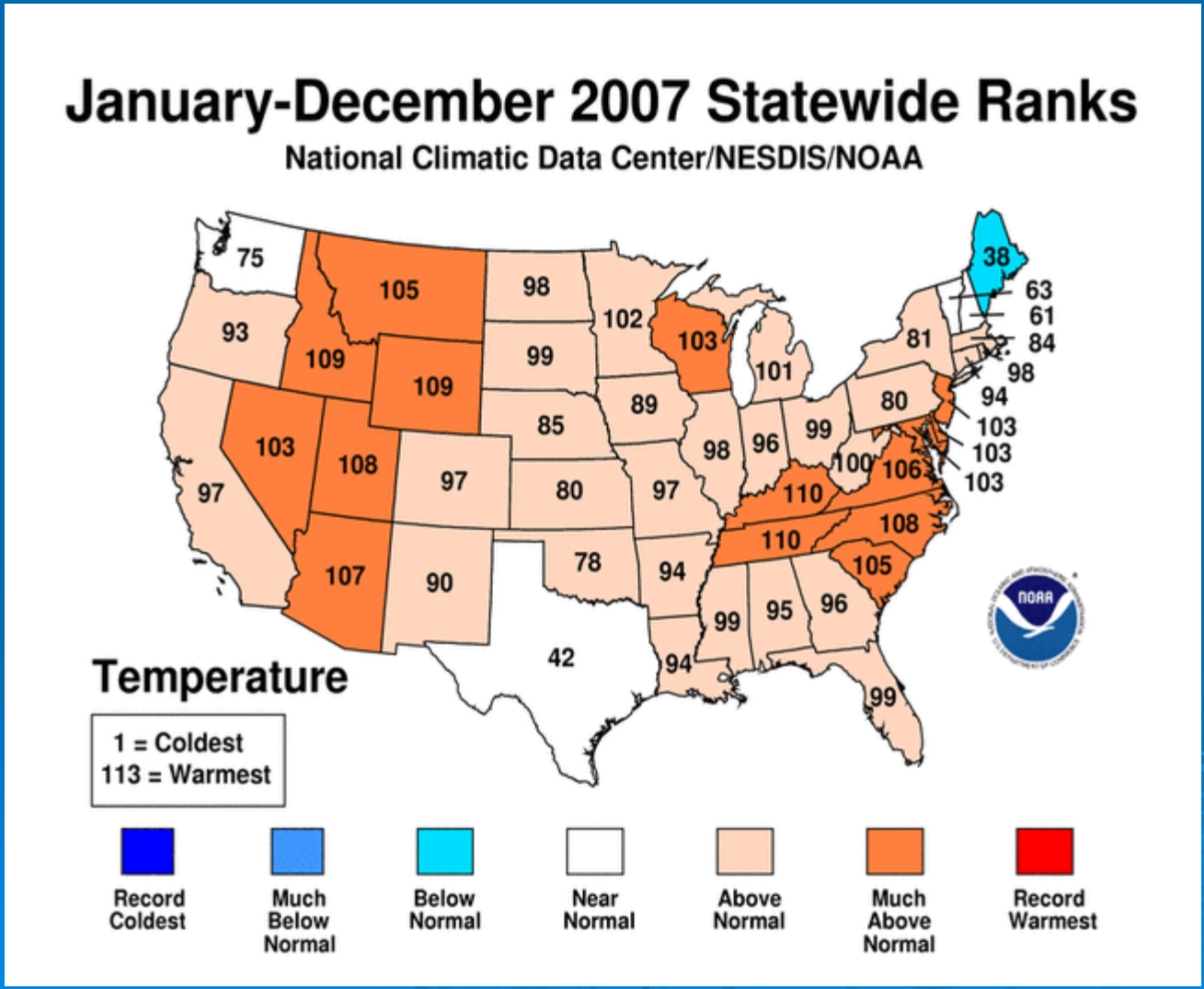
When You Need It?



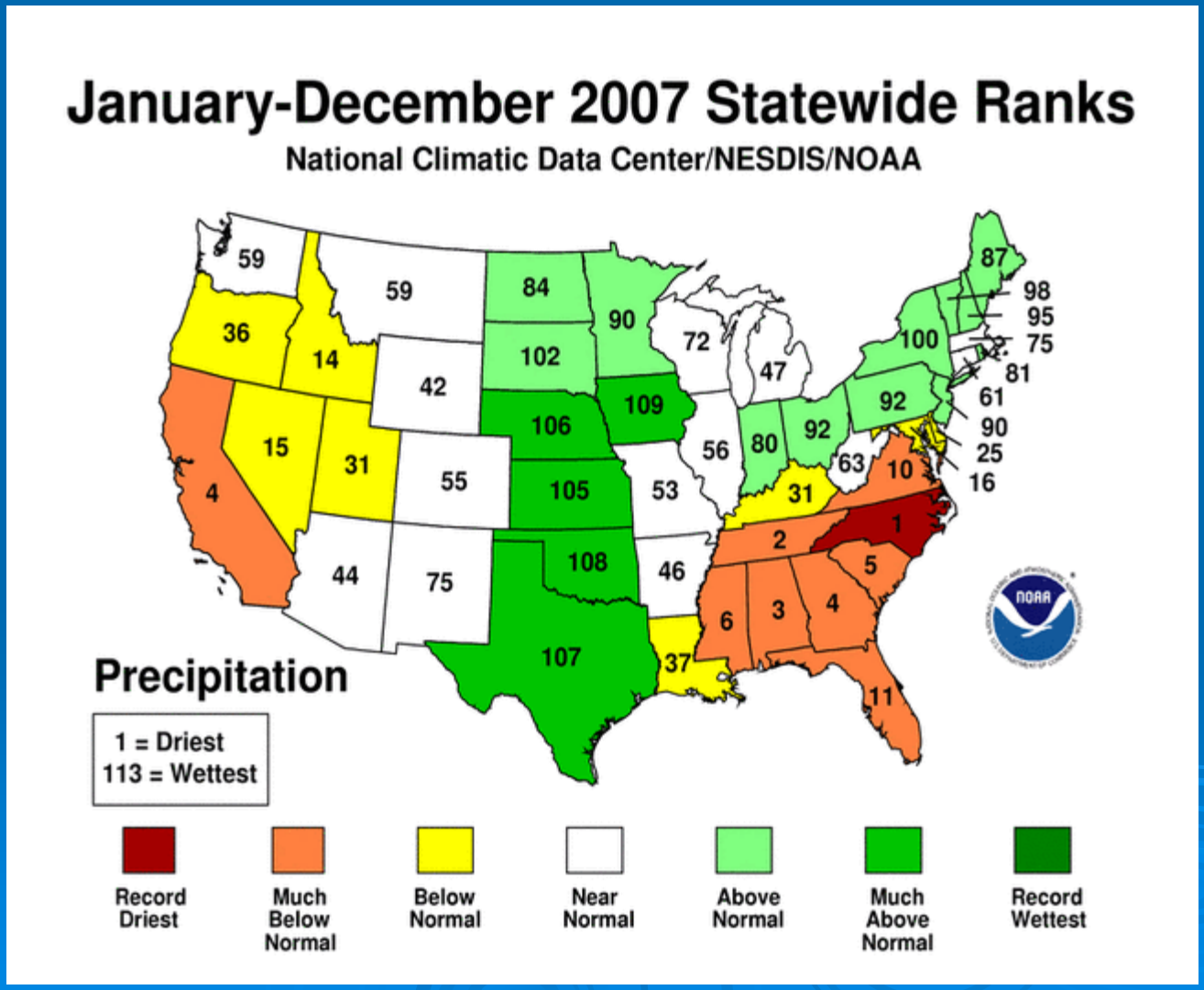
When You Need It?



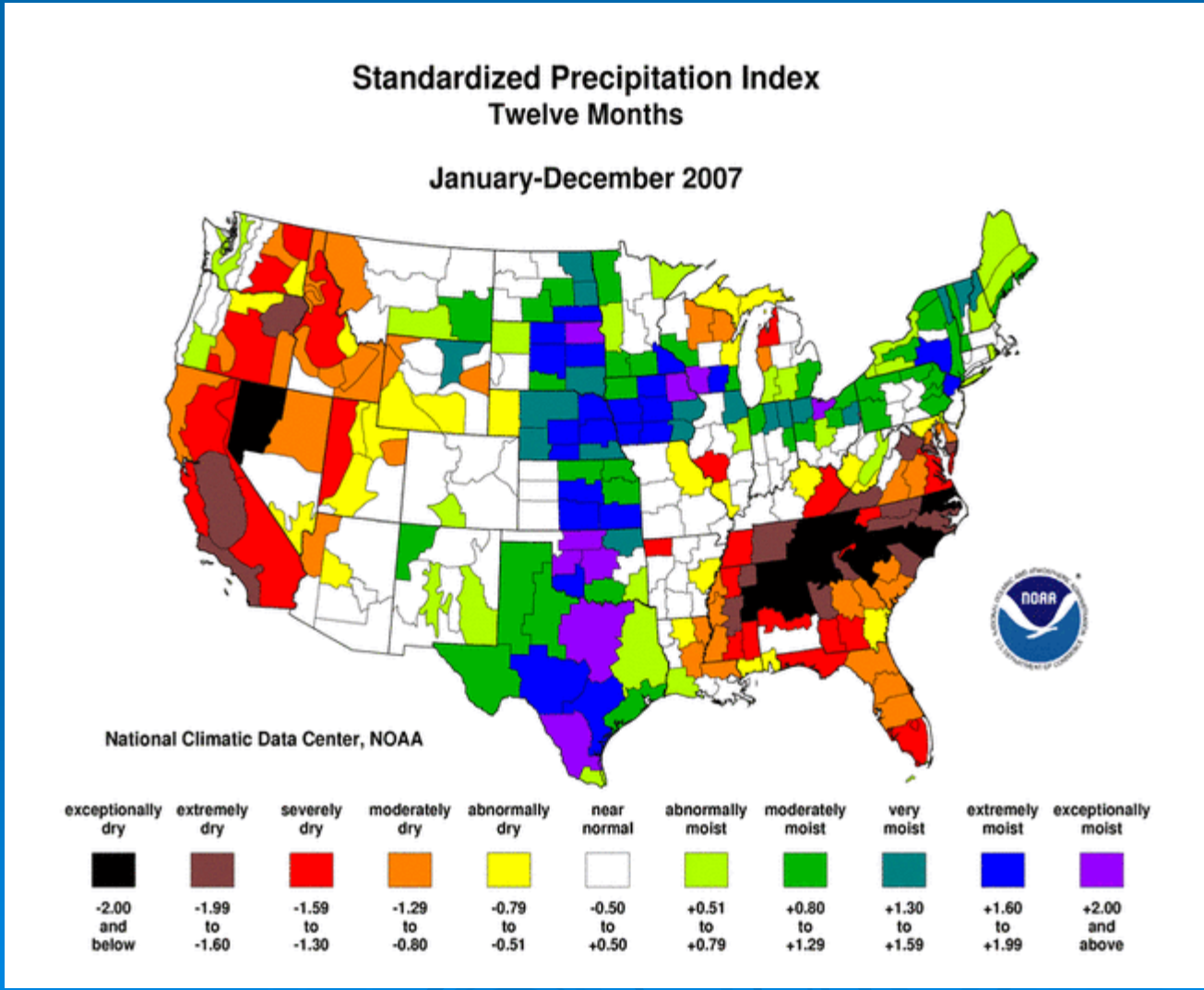
Compounding the Problem



Where & When You Want It?



Where & When You Want It?



Dealing with Stored Water Droughts

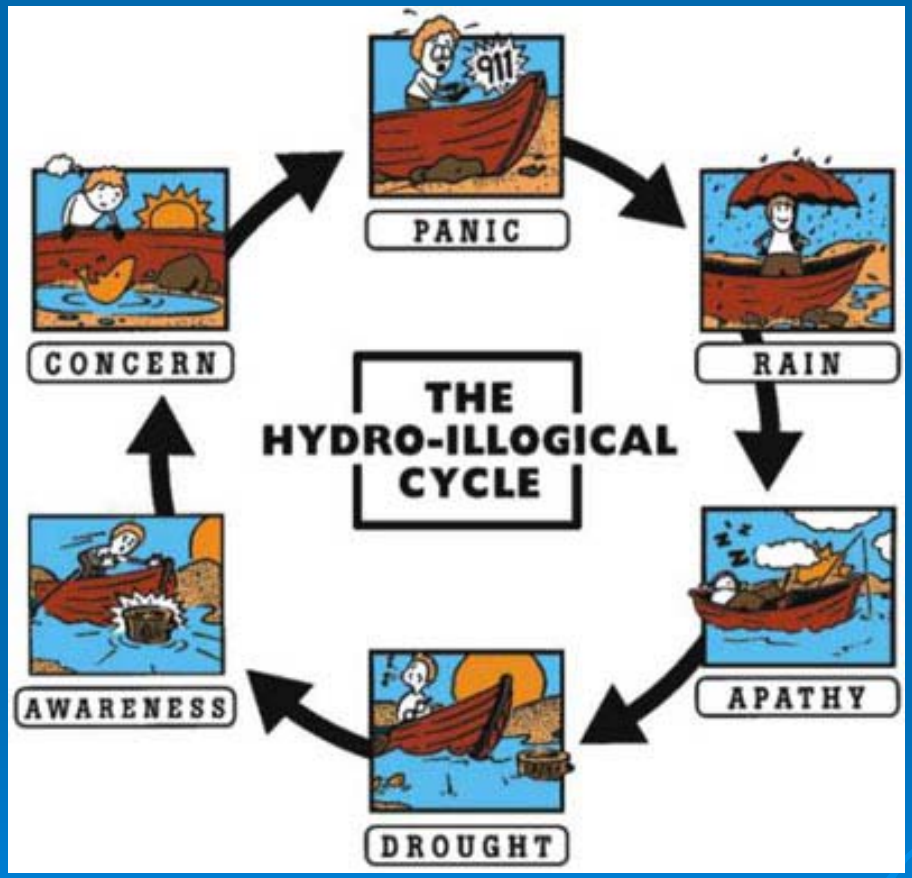
No one can tell when it will rain enough to reverse this trend, so water deliveries have to be reduced, *but to whom first and by how much?*

- There may be a conflict between fairness and good economic policy in making water allocations.
- The newest water uses may generate more income and tax revenue than the oldest established uses.

Such conflicts are normally resolved on a case-by-case basis.

Source: National Drought Policy Commission Report (2000).

The Hydro-illogical Cycle



Source: National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska, USA.

“Conflict, unlike any we’ve seen before, may soon be facing our nation.”

Colonel Byron Jorns, USACE

Water Wars: The Need for a National Water Policy

30 March 2007

Water Resource Policy
Challenges

- **Needs of Tennessee residents**
  - **Domestic consumption**
  - **Recreation**
  - **Power generation**
- **Needs of Business and Industry**
  - **Consumption**
  - **Navigation**
  - **Power generation**
- **Demands in other states that share watersheds**

Managing competing interests!

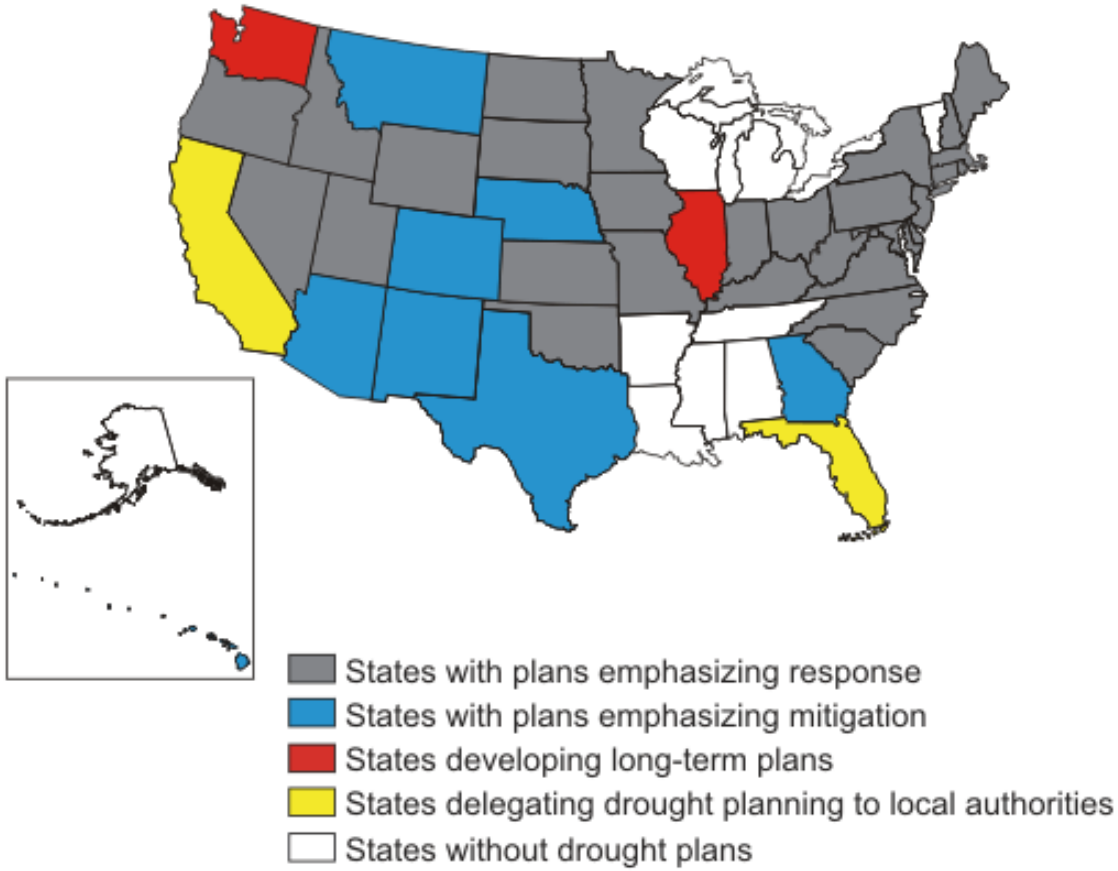
Managing Water Resources
Complicating Factors

- Interests within and between states compete more and more for the same resource as we grow and develop
- State boundaries don't recognize watersheds
- Watersheds don't recognize state boundaries
- The weather doesn't always cooperate

"Development, management, and protection of water resources should be controlled by that level of government nearest the problem and most capable of effectively representing the vital interest involved."

National Water Commission, 1973.

Status of Drought Planning
October 2006



Source: National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska, USA.

Governor Bredesen Proposes Funds to Improve Water Resources Management and Planning

Resources and Regulation
Improvements for Fiscal Year 2008-2009

	State	Federal	Other	Total	Positions
• **Water Resources** To provide non-recurring funds to improve water resources management and planning throughout the state in order to better meet the water supply needs of Tennessee communities. In addition to the state appropriation, $500,000 of unspent state appropriations, carried forward from fiscal year 2006-2007 for a rural water supply study, will be made available for this purpose.					
327.39 Water Supply	$2,000,000	$0	$500,000	$2,500,000	0
Sub-total	$2,000,000	$0	$500,000	$2,500,000	0

"And it never failed
that during the dry years
the people forgot about the rich years,
and during the wet years
they lost all memory of the dry years.
It was always that way."

—John Steinbeck

East of Eden