WATER RESOURCES STUDY COMMITTEE

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Authority: ***IC 2-5-25***

MEETING MINUTES[1]

Meeting Date:	**August 19, 2013**
Meeting Time:	**10:00 A.M.**
Meeting Place:	**State House, 200 W. Washington St., Senate Chamber**
Meeting City:	**Indianapolis, Indiana**
Meeting Number:	**1**

Members Present: **Sen. Edward Charbonneau, Chairperson; Sen. Michael Crider; Sen. Susan Glick; Sen. James Arnold; Sen. Richard Young; Rep. William Friend, Vice-Chairperson; Rep. Robert Morris; Rep. Jack Lutz; Rep. Steven Stemler; Rep. David Niezgodski; Rep. Patrick Bauer.**

Members Absent: **Sen. Lindel Hume.**

Call to order and opening remarks. Senator Charbonneau, Chair of the Water Resources Study Committee, called the meeting to order at 10:07 a.m. He welcomed everyone to the meeting and thanked those scheduled to make presentations. Senator Charbonneau expressed that water is a valuable commodity, and that it is critical to the state's infrastructure and to job creation. He explained that after suffering the worst drought in history in 2012, there is a need to be cognizant of the fact that water is a limited resource. Senator Charbonneau further expressed that it is his hope that the first meeting of the Water Resources Study Committee will be a first step in developing a comprehensive water plan for the state.

Introduction of members. The members of the Water Resources Study Committee introduced themselves.

Indiana's current water status. Dr. Jack Wittman was recognized to speak to the committee (Exhibit 1). Dr. Wittman's presentation addressed the following:

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[1] These minutes, exhibits, and other materials referenced in the minutes can be viewed electronically at http://www.in.gov/legislative Hard copies can be obtained in the Legislative Information Center in Room 230 of the State House in Indianapolis, Indiana. Requests for hard copies may be mailed to the Legislative Information Center, Legislative Services Agency, West Washington Street, Indianapolis, IN 46204-2789. A fee of $0.15 per page and mailing costs will be charged for hard copies.

- Economic issues surrounding drought.
- Availability of water resources nationally.
- Varying needs for water in Indiana by sector.
- Availability of ground water and surface water in Indiana.
- Relationship between growth and the availability of water resources.
- Need for regional planning to handle the risk of shortages.

In response to questions from committee members, Dr. Wittman:

- Explained that although some depleted aquifers can be recharged, the issue is how to recharge the aquifer.
- Explained that aquifers were created through the movement of glaciers which plowed sand and gravel into the earth through glacial action, which helps to explain the existence of more aquifers in northern Indiana compared to southern Indiana.
- Expressed that it is difficult to accurately determine how much water an aquifer holds.
- Indicated that the time frame for developing a water plan in order to avert serious problems is less than a decade.

U.S. Geological Survey. Dr. William Guertal, Director, Indiana-Kentucky Water Science Centers, was recognized to speak (Exhibit 2). Dr. Guertal's presentation addressed the following:

- Various data collected by the USGS.
- USGS data used by regulatory agencies.
- USGS funding from the Cooperative Water Program and the National Streamflow Information Program.
- USGS monitoring of surface water, ground water, and water quality.
- USGS data from surface water stations used for various purposes including flood warnings and forecasts, floodplain mapping, multipurpose water management systems, highway and bridge design, and others.
- USGS data from ground water stations used for drought monitoring, determining water availability and supply, and determining sustained flow in streams and rivers.
- USGS data from sentry gauges used for water quality and aquatic habitat assessments, toxic algae bloom studies, Gulf of Mexico hypoxia, and evaluation of agricultural and urban best management practices.
- The last assessment of water availability in Indiana, which was completed in 1980.
- Important issues to consider including any regional water resource planning activities completed, and state level water management strategies and planning completed in surrounding states.

In response to questions from committee members, Dr. Guertal:

- Explained that the USGS does not initiate water quality testing on its own initiative and must be asked to conduct testing by an entity that has taxing authority.
- Expressed that he would like to see more real time water quality monitoring, especially of ground water.

Climate and Indiana's water resources. Dr. Dev Niyogi, Indiana State Climatologist, was recognized to speak (Exhibit 3). Dr. Niyogi addressed the following:

- The historic drought of 2012.
- Characteristics of drought and the difficulty of monitoring, planning and mitigating drought.
- Summary of 2013 temperatures and precipitation.
- Comparison of 2012 and 2013 temperatures and precipitation.

- Factors in long range forecasts including the jet stream, globally connected weather patterns, and climate variability.
- Suggestion of a wetter trend and temperatures near normal values by seasonal outlooks and models.
- Issues to consider over the next decade including the likelihood of more ground water irrigation systems.
- The need for a new way of viewing urban areas and droughts.

Indiana Chamber of Commerce Vision 2025 and proposed water study. Vince Griffin, Vice President of Environmental and Energy Policy for the Indiana Chamber of Commerce, was recognized to speak (Exhibit 4). Mr. Griffin addressed the following:

- The importance of water to the manufacturing and agricultural industries.
- Creation of a system to address potential water shortages like Texas, a state with poor water resources and great population growth.
- The development of a water study plan by the Indiana Chamber of Commerce.

State agencies overseeing aspects of Indiana's water resources.

Indiana Utility Regulatory Commission (IURC). Carolene Mays, Commissioner of the IURC, provided an overview of the IURC's role in overseeing Indiana's water resources and an overview of SEA 132-2012 (Exhibit 5). Commissioner Mays addressed the following:

- The number of water and wastewater utilities regulated by the IURC.
- Explanation of SEA 132-2012 and data gathered from water utilities.
- General findings from research conducted as a result of SEA 132-2012, including discussion that very little research has been conducted on the nexus between water and economic development.
- Release of formal recommendations to the Regulatory Flexibility Committee on September 4, 2013.

In response to questions, Commissioner Mays:

- Explained that better coordination between agencies is needed since several state agencies have different responsibilities relating to water.
- Indicated that rate increases for utilities can result from federal and state mandates imposed upon the utilities.
- Explained that the data compiled by the IURC as a result of SEA 132-2012 will not account for water usage by agriculture, but will address usage by water utilities.

Indiana Department of Environmental Management (IDEM). Thomas Easterly, Commissioner of IDEM, provided information about IDEM's water supply authority (Exhibit 6). Commissioner Easterly addressed the following:

- IDEM's water responsibilities.
- IDEM's Drinking Water Program.
- Types of public water systems, such as community public water systems, nontransient noncommunity public water systems, and transient public water systems.
- Steps taken by IDEM to ensure that public drinking water is safe.
- IDEM programs that impact water quantity.

In response to questions, Commissioner Easterly:

- Explained that the public receives notice before permits are issued to nontransient

noncommunity public water systems.
- Indicated that no one can legally discharge into U.S. waters without a permit.
- Indicated that the current permit for the BP refinery in Lake County includes limits on the amount of lead and mercury that may be discharged.
- Reported that a public hearing was held concerning the proposed renewal of the BP refinery's water discharge permit, and final approval of the permit application is pending.
- Indicated that he expects that the level of discharges of lead and mercury allowed by the renewed permit will be lower than the levels allowed under the current permit for the BP refinery.
- Indicated that the ability to detect the presence of pollutants like lead and mercury has changed in recent years.
- Explained that IDEM uses the data provided by the monitoring conducted by the DNR and USGS in addition to conducting its own monitoring.

Indiana Department of Natural Resources (DNR). Mark Basch, Section Head, Water Rights/Use at DNR, provided an update on water resource availability and management programs in Indiana (Exhibit 7). Mr. Basch addressed the following:

- Information gathered by the Division of Water on surface and ground water availability.
- Aquifer systems mapping by the Division of Water.
- Laws governing significant water withdrawal facilities (SWWF).
- Total annual withdrawals of surface water and ground water from 1985-2012.
- Total registered SWWFs during 2013.
- Ground water rights investigations during 2012-2013.
- Emergency regulation of surface water rights.
- The water shortage plan under DNR.
- Indiana's implementation of the Great Lakes Compact.

In response to questions, Mr. Basch:

- Indicated that there are facilities that withdraw water in Indiana and sell it to purchasers in Illinois and Ohio.
- Explained that under current law, there is only a requirement for registration with DNR and no requirement to obtain a permit before drilling a water well.
- Explained that he would need to evaluate the resource to be able to determine if a well withdrawing water on the Indiana side of the Ohio River is affecting other Indiana wells, and added that he has not seen a decline in water levels in that aquifer.

Indiana State Department of Agriculture (ISDA). Jordan Seger, Director of Soil Conservation for the ISDA, provided an overview of the ISDA's role as it relates to Indiana's water resources. Mr. Seger addressed the following:

- ISDA's administration of the Clean Water Indiana Program.
- ISDA's assistance provided to landowners including information about best management practices.
- ISDA's non regulatory functions with regard to water resources.
- Financial support for soil and water conservation districts.
- Division of Soil Conservation's nutrient reduction strategy.

Indiana State Department of Health (ISDH). Mike Mettler, Director of Environmental Public Health for the ISDH, discussed the ISDH's role relating to water quality (Exhibit 8). Mr. Mettler addressed the following:

- ISDH's Onsite Sewage Systems Program.

- Water fluoridation and inspections.
- Private drinking water wells.

In response to questions, Mr. Mettler:

- Explained that those who have failing septic systems and who face property condemnation if the septic system is not fixed could seek financial assistance from township trustees and also through the U.S. Department of Agriculture's low interest loan program specifically for the repair of septic systems.

Summary of testimony and future meetings. Senator Charbonneau called upon Dr. Wittman to provide a summary of the testimony received during the meeting and issues to consider at future meetings.

Dr. Wittman explained that the presentations confirmed the challenge of many entities conducting many programs to track problems with the water supply, and that there is no central office for water resources in the state. Dr. Wittman also indicated that Indiana has a water resources research center at Purdue University and it is the only one in the country that does not receive state funding.

Senator Charbonneau indicated that he plans on conducting a second meeting of the Water Resources Study Committee and he would appreciate comments from the members of the committee regarding ideas of how to proceed.

Adjournment. Senator Charbonneau adjourned the Water Resources Study Committee at 1:22 p.m.

Exhibit 1
Water Resources Study Committee, Meeting #1
August 19, 2013

Preparation for Summer Study Committees

Indiana's Water

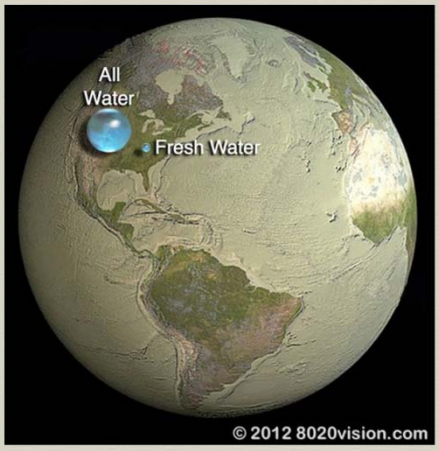
Current Status / Opportunities for New Policy

JACK WITTMAN, PHD

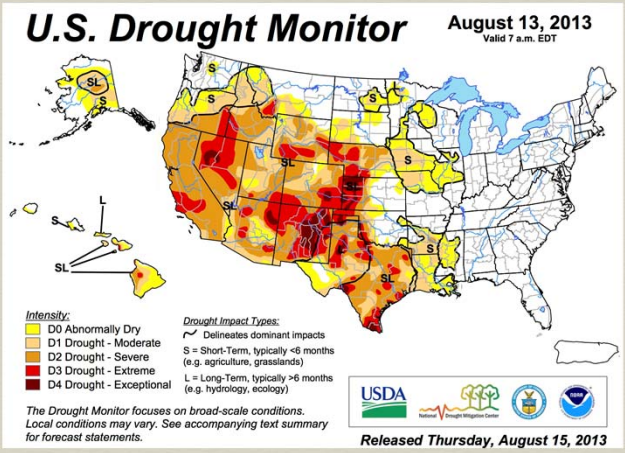
Groundwater Hydrologist

August, 2013

Global Perspective



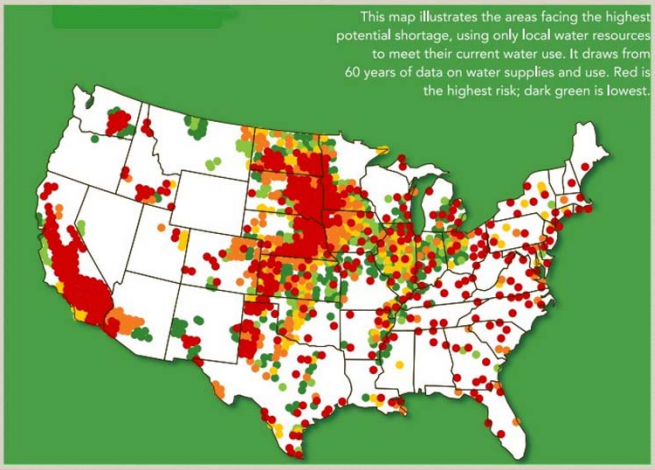
Persistent Drought



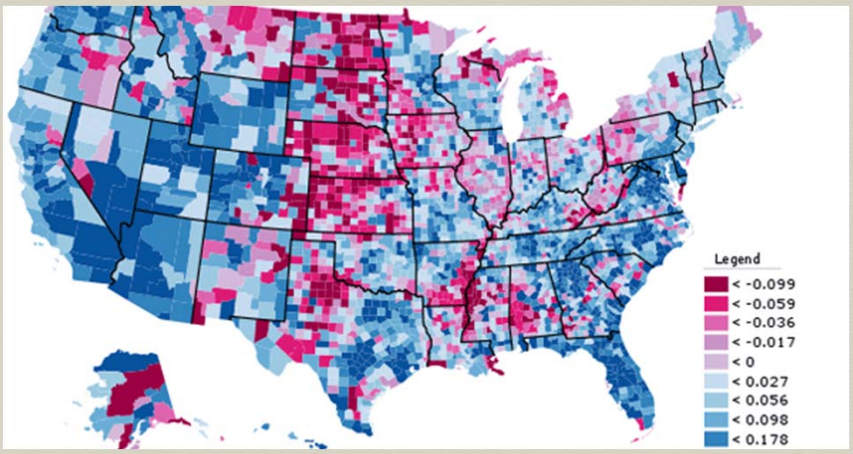
Where does drought cause economic problems?

- Too much use
- Limited supplies
- Conflicts among users (no rules)
- Reduction in economic activity

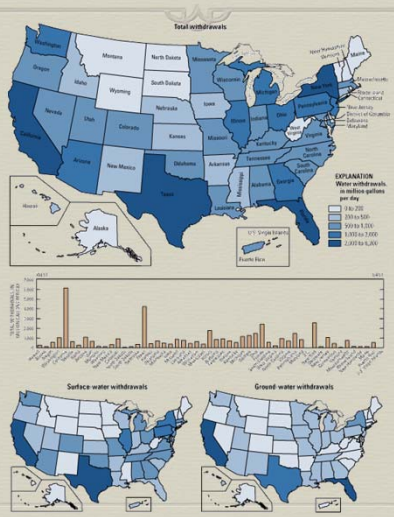
Availability Nationally



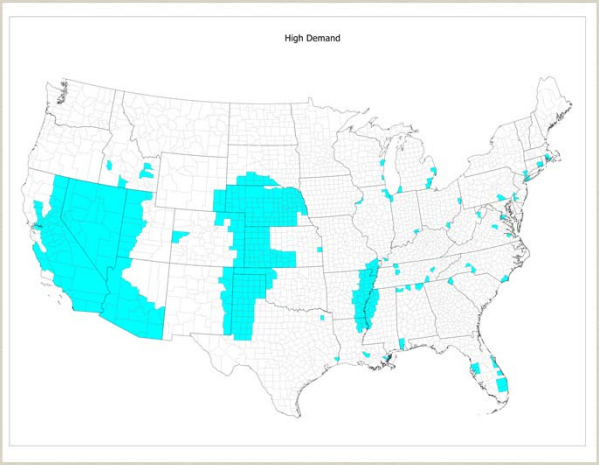
Population Change



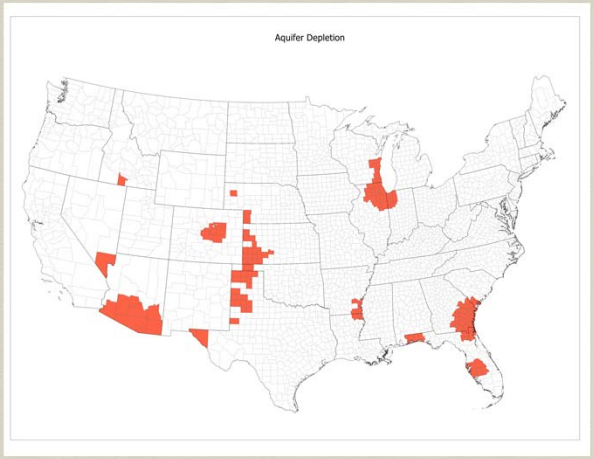
Geography of water use



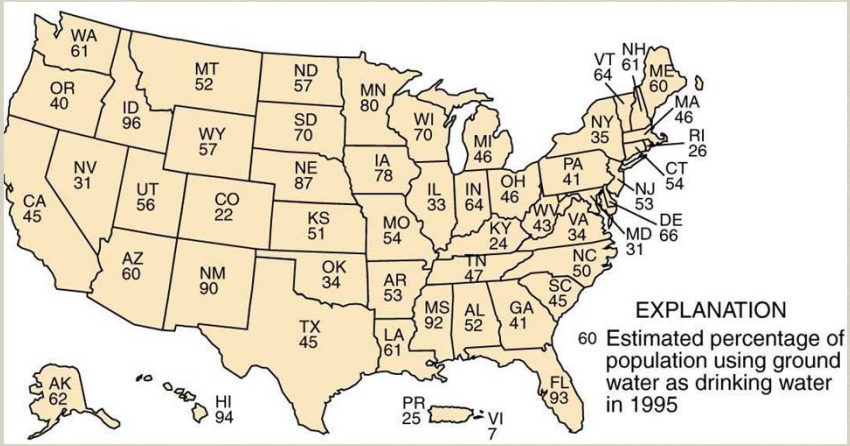
Competition for Water

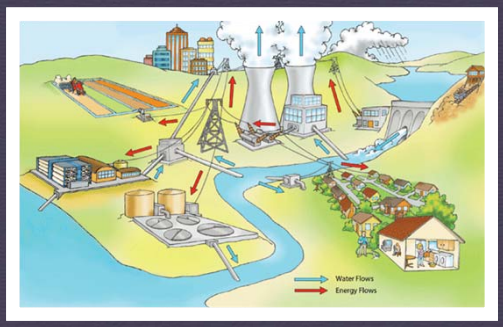


Aquifer Depletion



Who uses groundwater?





Need for Water in Indiana

By water use sector

Need for Water

Sector	Need
Agriculture	Growing demand and profit, more irrigation
Industrial	Available from L. Michigan for economic development
Municipal	Supply planning needed for distribution between basins
Power	Indiana has the grid and the water to grow

What does each sector want?

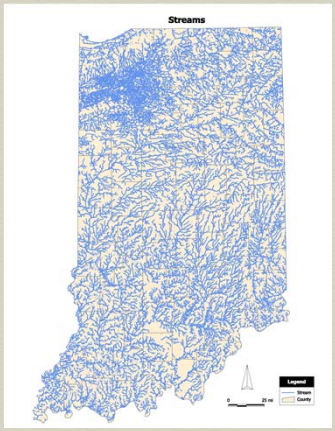
Sector	Interest
Agriculture	Confidence in well spacing and aquifer recovery
Industrial	Available 24/7/365 with little uncertainty
Municipal	Flexibility to manage and optimize resources
Power	Low flow to support use and discharge of cooling water

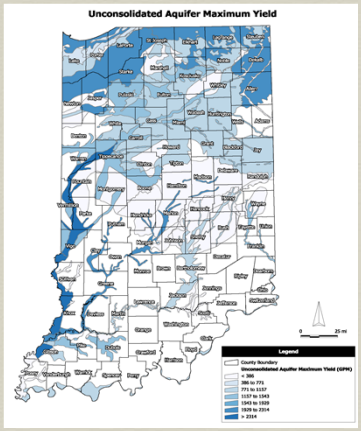
Indiana's HydroGeography

Indiana's HydroGeography

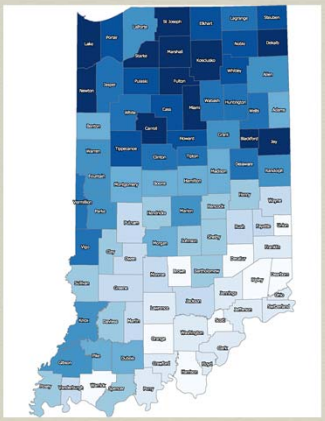
Water in Indiana

- Surface water
- Ground water (shallow)





Groundwater Availability



Indiana's HydroGeography

Region

- Lake Michigan Basin
- Kankakee/Wabash
- Wabash/White River
- Unglaciated South

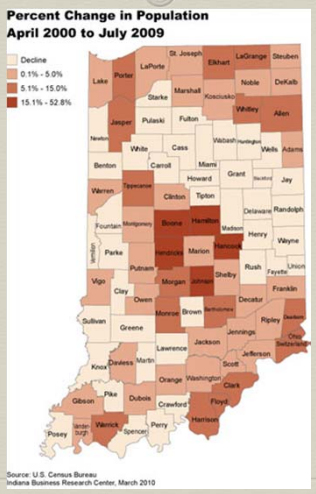
Condition

- GL Compact constraints and allocation opportunity
- Increased drilling for irrigation and agriculture
- Local seasonal demands requires regional planning
- Vulnerable small systems between large rivers

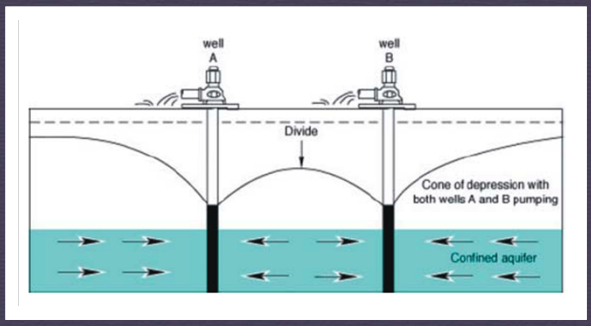
Where do we need water?

- Where we have demand
- Where infrastructure exists
- Where there will be growth

Growth by County (need)



challenge = use + limitations



Policy Options

What makes sense for Indiana?

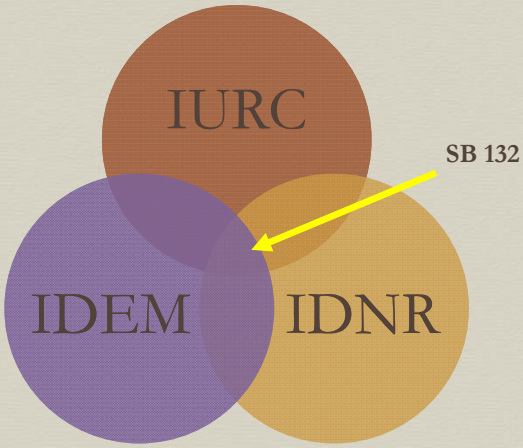
Drinking Water

water quality, treatment, health and safety

water rates, service territory, wholesale agreements

water use reporting, well log, local impacts

SB 132 – only PWS



Cooling Water

IDEM

air quality, cooling water intake and discharge, **NOT** water use

Power Plant

IURC

power rates, service territory, wholesale agreements

IDNR

water use reporting, well log, local impacts

Irrigation

runoff control, **NOT** water use

IDEM

State Chemist

pesticide application

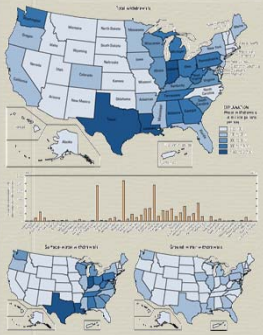
Agriculture

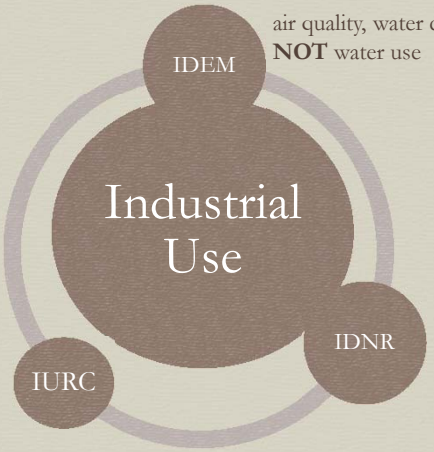
IDNR

water use reporting, well log, local impacts

IURC

Industry





air quality, water discharge, **NOT** water use

water use reporting, well log, local impacts

Policy Status

- SB 132 report is being developed by IURC
- Limited analysis of groundwater availability/need
- Irrigation wells being drilled as fast as possible (NW)
- Central Indiana needs additional supplies to grow
- Power plants need adequate supplies
- Many interests in water policy

Risk of Shortages

- Barely adequate local supplies in Central Indiana
- Limited groundwater in some areas
- Infrastructure investment in the South
- Regional planning is needed

Conclusions

- Policy must fit uses AND resources
- Monitoring is needed to establish baseline
- State has the resources, skills and use data
- Federal government could help collect water supply data
- Collaboration rather than regulation works

Exhibit 2
Water Resources Study Committee, Meeting #1
August 19, 2013

USGS
science for a changing world

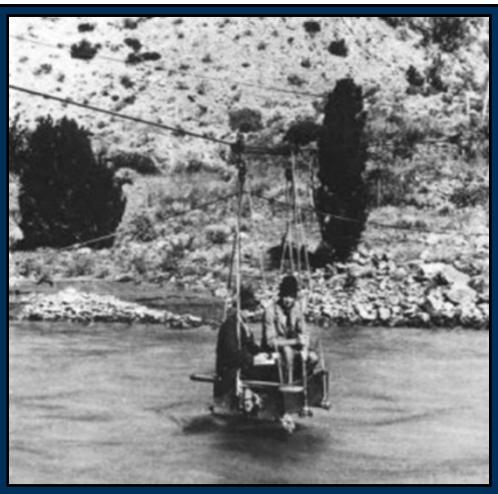
Water Resource Study Committee
U.S. Geological Survey Presentation

Dr. William Guertal
Director, IN-KY Water Science Centers
June 19, 2013

U.S. Department of the Interior
U.S. Geological Survey

About USGS

- Bureau of Department of Interior
- HDQ in Reston, VA
- About 8,400 employees
- 86 Science Centers
- Collecting water data since 1880s
- Water Science Center in every state and territory



USGS has collected hydrologic information in IN since 1903, when surface-water gaging data were first collected at 8 sites.

USGS

USGS
science for a changing world

We provide the Nation with reliable and impartial science and information to understand our natural resources.

USGS is a scientific agency and has NO regulatory authority

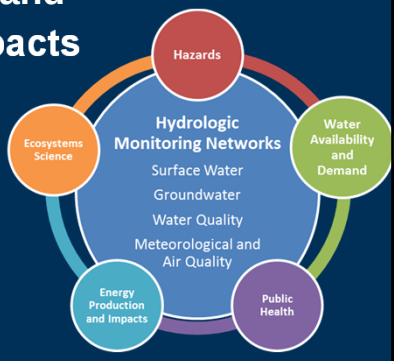
Commonwealth Capabilities

- Hydrologic monitoring
- Air monitoring
- Streamflow statistics – low flows and flood frequencies
- Nutrient monitoring and studies
- Aquatic biology studies
- Mercury in the environment studies
- Geophysical studies
- Karst studies and monitoring
- Flood inundation and steam erosion hazard studies
- Bathymetric mapping tools and expertise

USGS

USGS INKY Commonwealth Science-Focus Areas

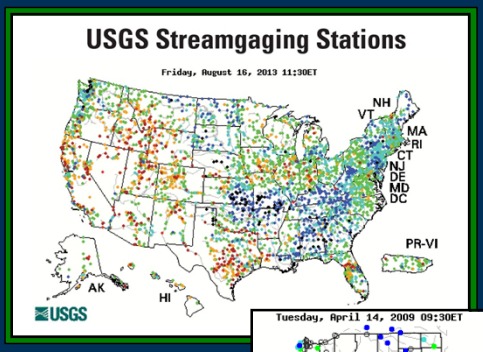
- Hydrologic Monitoring Networks
- Hazards
- Ecosystems
- Water Availability and Demand
- Energy Production and Impacts
- Public Health

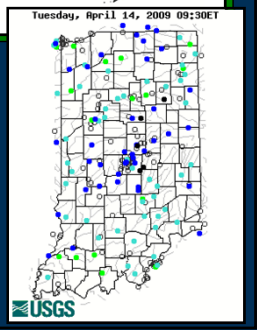


USGS

USGS Network Features

- National network
- Uniform National standards
  - Data collection
  - Analysis
  - Storage
  - Delivery
- Long-term archive
- Real-time telemetry





USGS

Hydrologic Monitoring Networks

- Stage (gage height)
- Streamflow
- Lake/reservoir level
- Groundwater level
- Precipitation
- Water temperature
- Sediment
- Nitrate
- Other water quality constituents

USGS

40+ Network Cooperators

- U.S. Army Corps of Engineers
- IDNR
- IDEM
- INDOT
- IDHS
- Indianapolis
- Fort Wayne
- Anderson
- Carmel
- Vincennes
- French Lick
- West Baden Springs
- Fishers
- Michigan City
- Zionsville
- River Basin Commissions: Kankakee, Maumee, Little Calumet
- Bartholomew, Boone, Miami, Rush, Hamilton, Starke, Orange, Shelby, Tipton &Tippecanoe Counties
- Indianapolis Airport Authority
- Indianapolis Museum of Art
- ORSANCO
- 11 private companies

USGS

Network Funding

FY13 Total Funding - $2.6 million

- USACE/OFA - $314,000 – 12%
- State of Indiana* - $615,000 – 24%
- Cities & Counties - $412,000 – 15%
- Private/non-profit - $177,000 – 7%
- USGS - $1.1 million – 42%

*Includes River Basin Commissions, Purdue University

USGS

USGS Funding for Networks

- Cooperative Water Program (Coop)
  - http://water.usgs.gov/coop/
- National Streamflow Information Program (NSIP)
  - http://water.usgs.gov/nsip/
  - Goal - provide a "backbone" or core streamgage network that are critical to national streamflow information needs and that would be funded totally with Federal funds.

USGS

Water Monitoring in IN - USGS

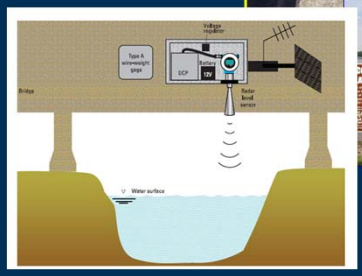
- Surface Water
- Ground Water
- Water Quality

Numerous agencies run various monitoring networks throughout the State

USGS

Surface Water Stations

- 213 streamgages
- 23 lake/reservoir gages
- 66 precip sites



USGS

Importance and Uses

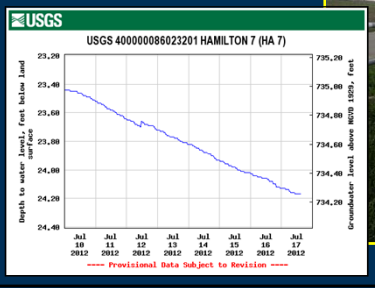
- Plan, design, operate, maintain multipurpose water management systems
- Flood warnings & forecasts
- Floodplain mapping
- Highway & bridge design
- Monitoring environment and aquatic habitats
- Protecting water quality and regulating pollutant discharges
- Managing water rights
- Education and research
- Recreation – paddling, fishing, etc…

A million Web hits annually for IN

USGS

Ground Water Stations

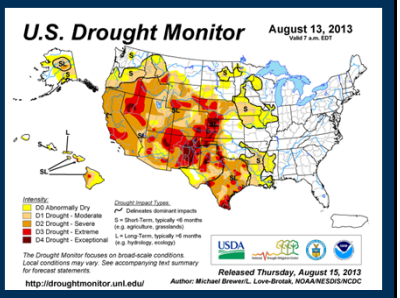
- 37 continuously recording GW observation wells
- Local networks
  - Northwest Indiana
  - St. Joseph County
  - Hamilton County

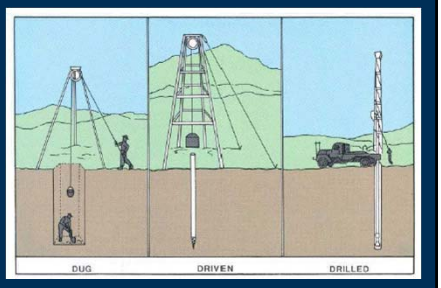


USGS

Importance and Uses

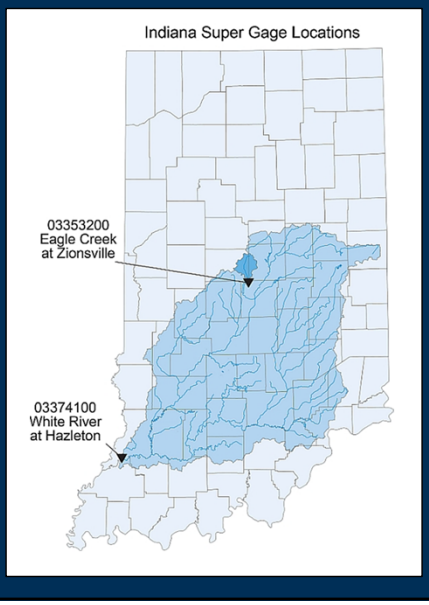
- Drought monitoring
- Water availability and supply
- Sustained flow in streams and rivers





USGS

Sentry Gages



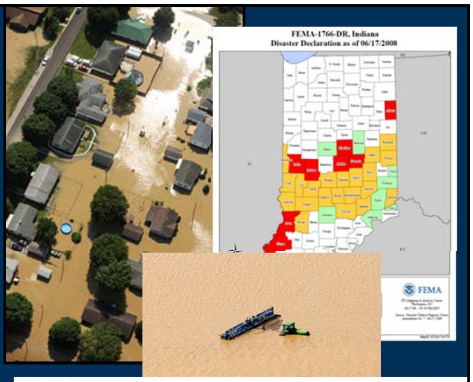
Importance and Uses

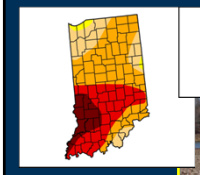
- Water quality and aquatic habitat assessments
- Toxic algae bloom studies
- Gulf of Mexico hypoxia
- Evaluation of agricultural and urban best management practices
- Recreation

USGS

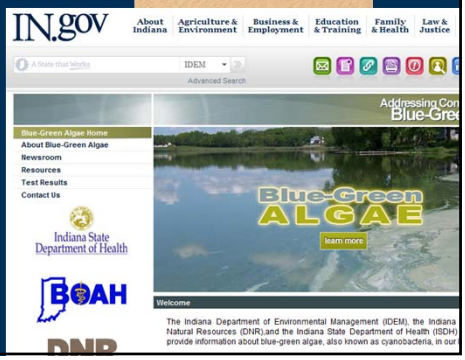
The Big Questions

- Floods
- Droughts
- Water Quality
- Water Availability



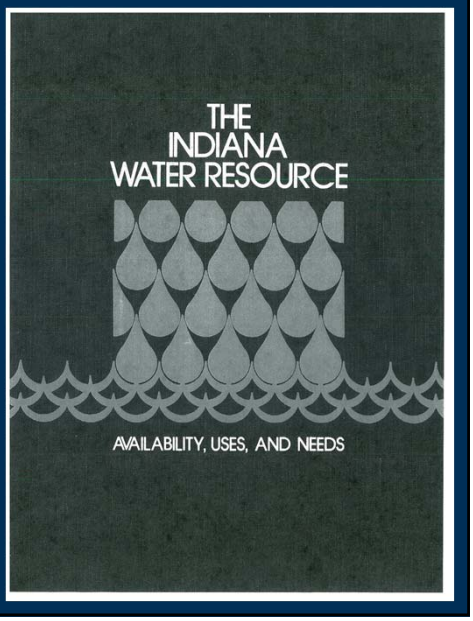


USGS



The Big Question – Water Availability

- Last assessment in IN was done in 1980
- Governor's Water Resource Study Commission
- Important topic to many groups and interests



USGS

Important Issue – Requires Partners

Indiana Association for Floodplain and Stormwater Management
INAFSM

SILVER JACKETS
MANY AGENCIES ONE SOLUTION
Be Risk Aware!

Indiana Water Monitoring Council

INDIANA WATER RESOURCES ASSOCIATION

Indiana GEOGRAPHIC INFORMATION COUNCIL

USGS

Groundwater Focus Committee

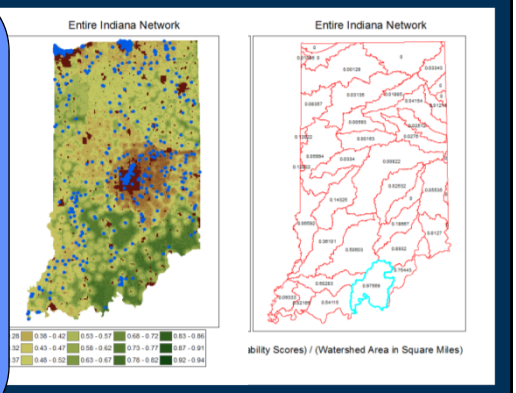
- **30 members from 18 institutions**

Indiana-American Water	IDEM	USGS
Aqua Indiana, Inc.	IDNR	IACT
BSU Geology	IGS	IU SPEA
Fish Indiana	ISDA	Alpha EMC
Hamilton County	OISC	
Valparaiso City Utilities	Purdue Ag	
St. Joseph Co. Health Dept.	Xenon Geosciences	

USGS

Monitoring Well Network Analysis

Watershed
Hydrogeology
Ecology
Physiography
Population
County

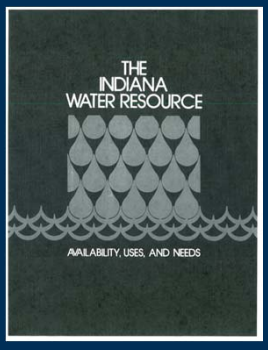


USGS

Credit: Ben Sperl, IUPUI, 2013

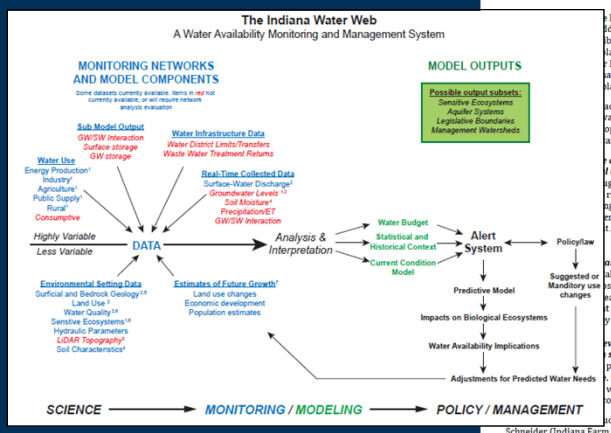
"The Indiana Water Resource" Informal Group

- Indiana Chamber of Commerce
- Indiana Farm Bureau
- Indiana Soybean Association
- Indiana Geological Survey
- Indiana Office of Community and Rural Affairs
- Indiana Office of Utility Consumer Counselor
- IUPUI Center for Earth and Environmental Science
- Layne Hydro
- IDEM
- IDNR
- NRCS
- USGS



USGS

Background Information



Background information for an Indiana Water Resources Management Plan

July 2013

long-range water resources planning effort for the State of Indiana ddress water and waste water resources through all aspects of ibution, collection, and reuse. Indiana Governor Mike Pence has lanning a significant priority. In his "Roadmap for Indiana", Indiana to develop a comprehensive water resource management amber of Commerce in its "Vision 2025" seeks a more robust long- lanning effort.

achieving this goal, a team was formed to determine how other ater rights and ownership and (2) have developed water resource opment of a new Indiana water resource evaluation. Answers to the an be found in this document:

different legal theories for Groundwater Ownership and Rights l used in the United States? Five different legal theories have ghout the United States regarding how courts should allocate rights. In recent years, states have been supplementing, or in some ng, the common law with statutory permitting systems. Additionally, en taking explicit action to either include or exclude groundwater from t. Current groundwater laws in Indiana and four neighboring states are

al water resources planning activities have been completed? The aken from completed regionally extensive water resources plans. se areas with similar environments and water use demands, can eam developing a similar plan and tools for Indiana for the types of t will need to be addressed and make them aware of potential y may encounter.

vel water management strategies and planning have been states surrounding Indiana? A brief review of water plans for 20 state was conducted to determine which states had , when those plans were last updated, who was involved in the what elements were included in the plan. Summaries of the ollected are included in a map and table.

ded in this document was compiled by Alyson Blume and Justin Schneider (Indiana Farm Bureau). David Lampe (USGS Indiana Water Science Center), and Sean Stulz and Pamela Martin (Center for Earth and Environmental Sciences, IUPUI).

USGS

Useful Information

- What are the different legal theories for Groundwater Ownership and Rights to Withdrawl used in the US?
- What regional water resource planning activities have been completed?
- What state level water management strategies and planning have been completed in states surrounding IN?

USGS

Summary

- The IN Water Science Community have the parts, pieces, and partners to put together a new IN Water Resource program.
- “Whiskey’s for Drinking and Water’s for Fighting” – Mark Twain

USGS

Questions?

USGS

Hot, Dry to Cold and Wet?
A Tale of Two Years

2012 versus 2013: Planning for Change

Dev Niyogi, Indiana State Climatologist
Purdue University
Department of Agronomy
Department of Earth, Atmospheric, Planetary Sciences

Email: iclimate@purdue.edu climate@purdue.edu
Websites: iclimate.org landsurface.org

2012 will be remembered for the historic drought..

image: S. Casteel, Purdue Univ
http://www.purdue.edu/newsroom/general/2012/120614NiyogiDrought.html

NPR.org getty images/Scott Olson
http://www.npr.org/blogs/thetwo-way/2012/07/18/156981232/drought-disasters-declared-in-more-counties-1-297-affected-so-far

Some characteristics of Drought

- Recurring temporary event, i.e. not rare, nor random (predictable?), or a permanent feature
- Characteristics and impacts vary from region to region
- Natural hazard (but human decisions could contribute to the impacts)
- Deviation from normal when the regional water budget goes in the deficit

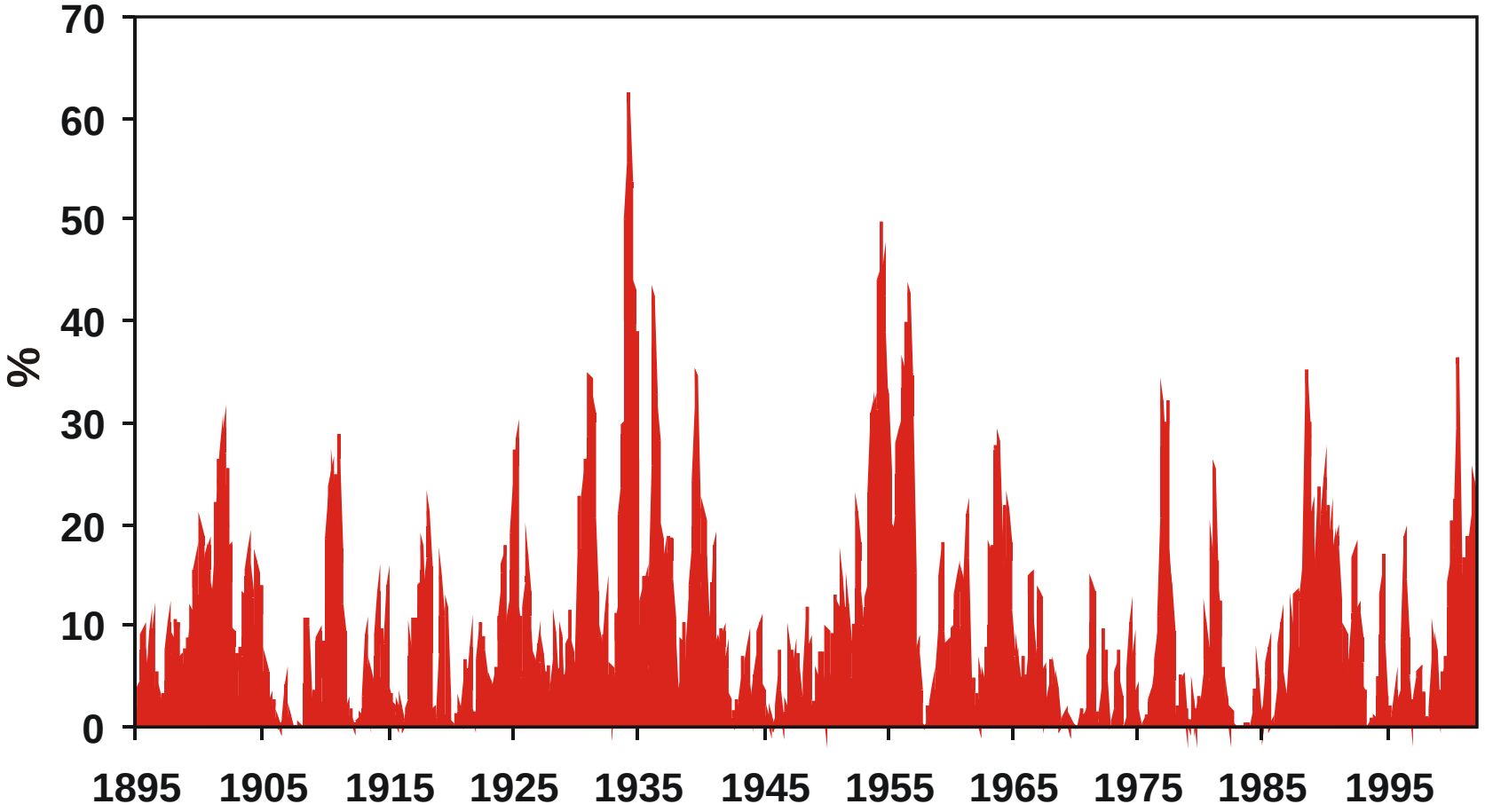
Drought Differs From Other Natural Hazards

- slow onset or "creeping phenomenon"
- absence of a precise, universal definition
- impacts are nonstructural and spread over large areas--makes assessment and response difficult
- impacts are complex and affect many people

Therefore, monitoring, planning, and mitigation difficult

Percent Area of the United States in Severe and Extreme Drought

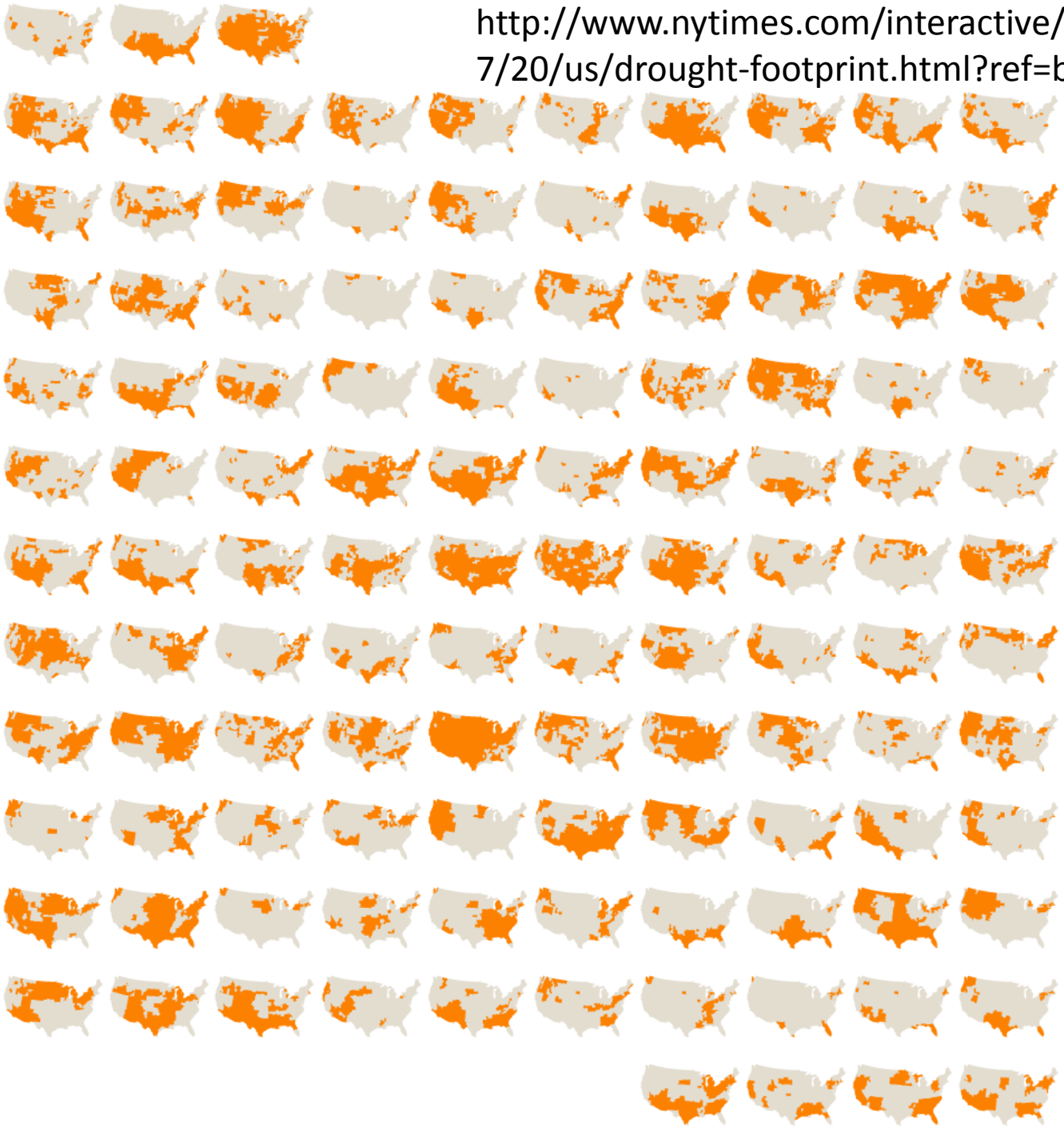
January 1895–July 2002



Based on data from the National Climatic Data Center/NOAA

2010

http://www.nytimes.com/interactive/2012/07/20/us/drought-footprint.html?ref=business



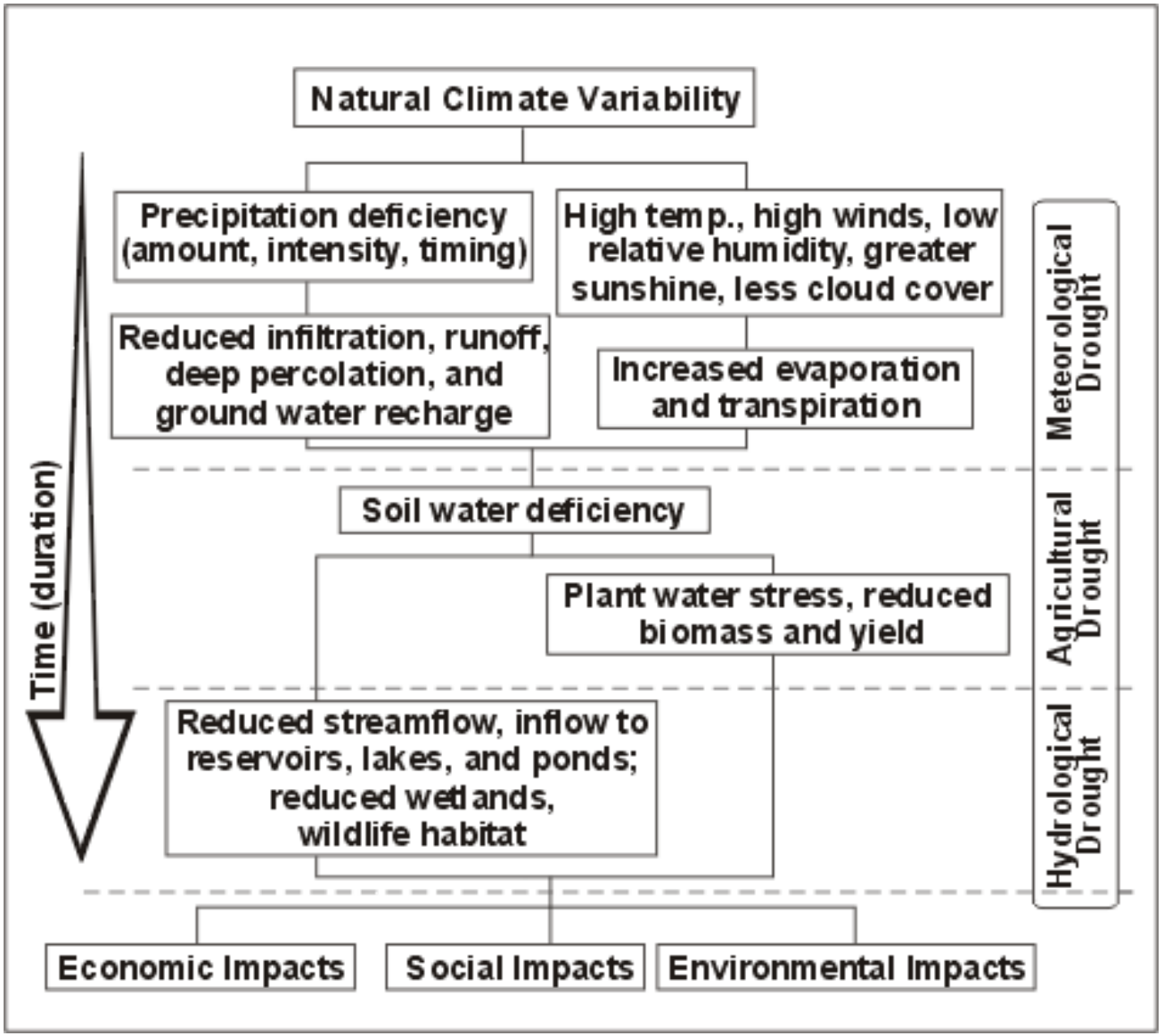
1900

In simplest terms, drought originates from a deficiency of precipitation over an extended period of time….

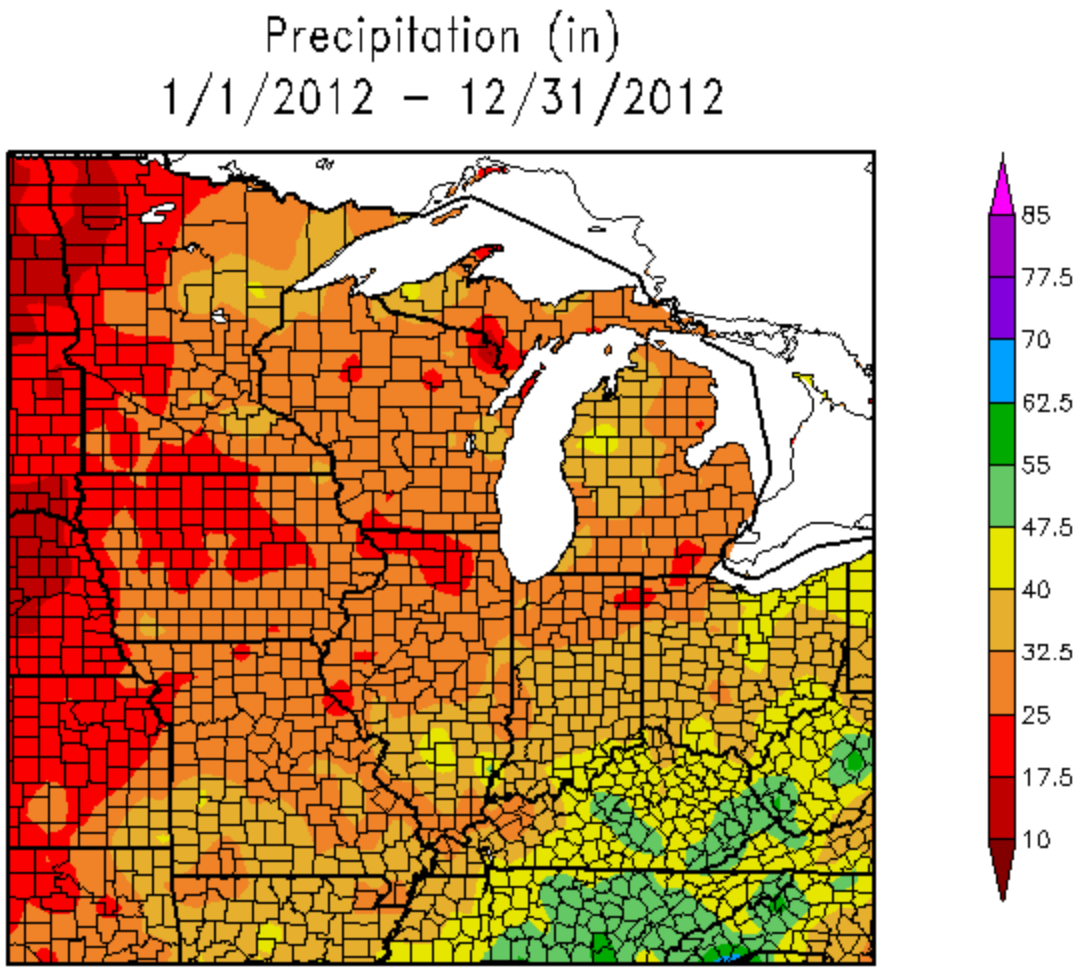
Droughts differ in terms of:

- INTENSITY
- Duration
- Spatial Extent
- Timing

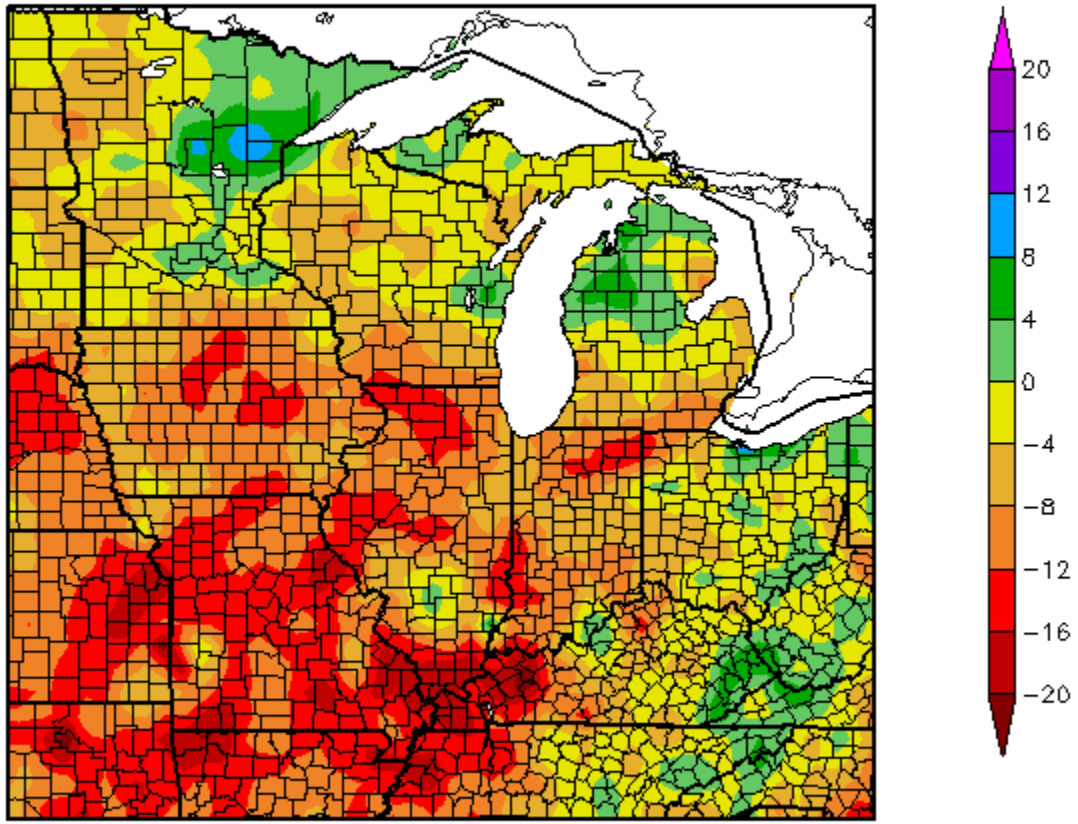
World Meteorological Organization (WMO) Perspective



The drought of 2012



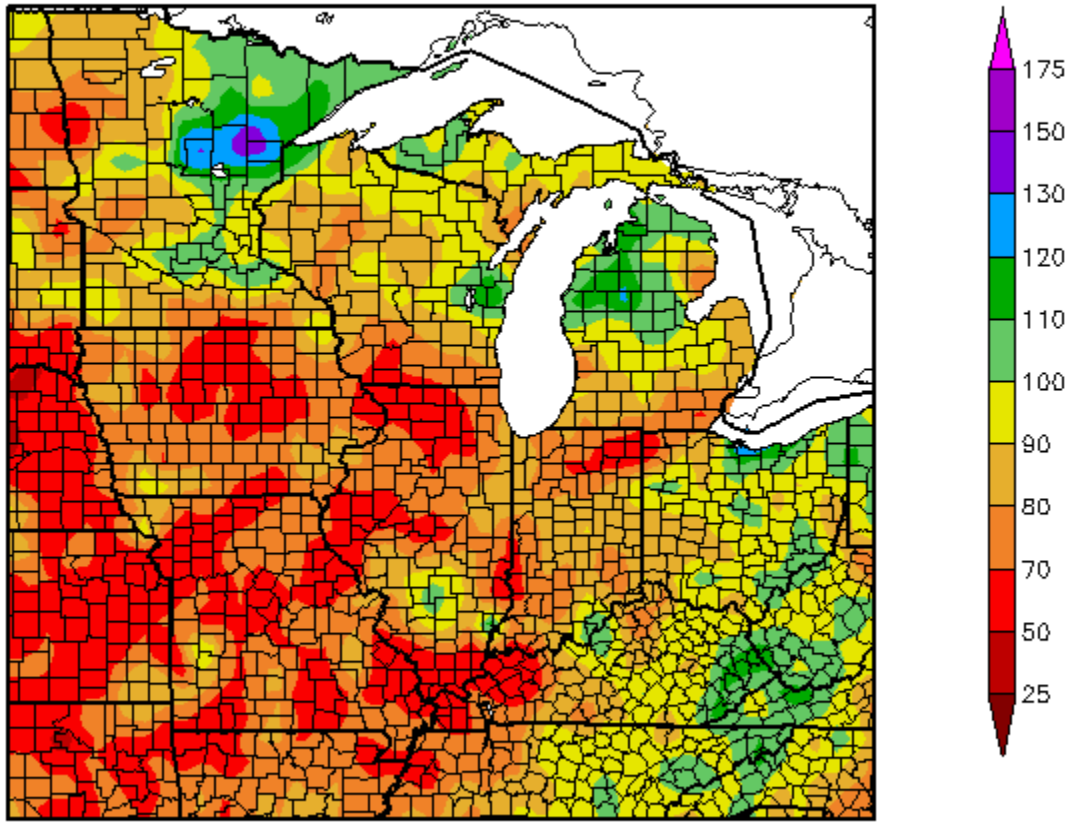
Departure from Normal Precipitation (in)
1/1/2012 - 12/31/2012



Generated 1/5/2013 at HPRCC using provisional data.

Regional Climate Centers

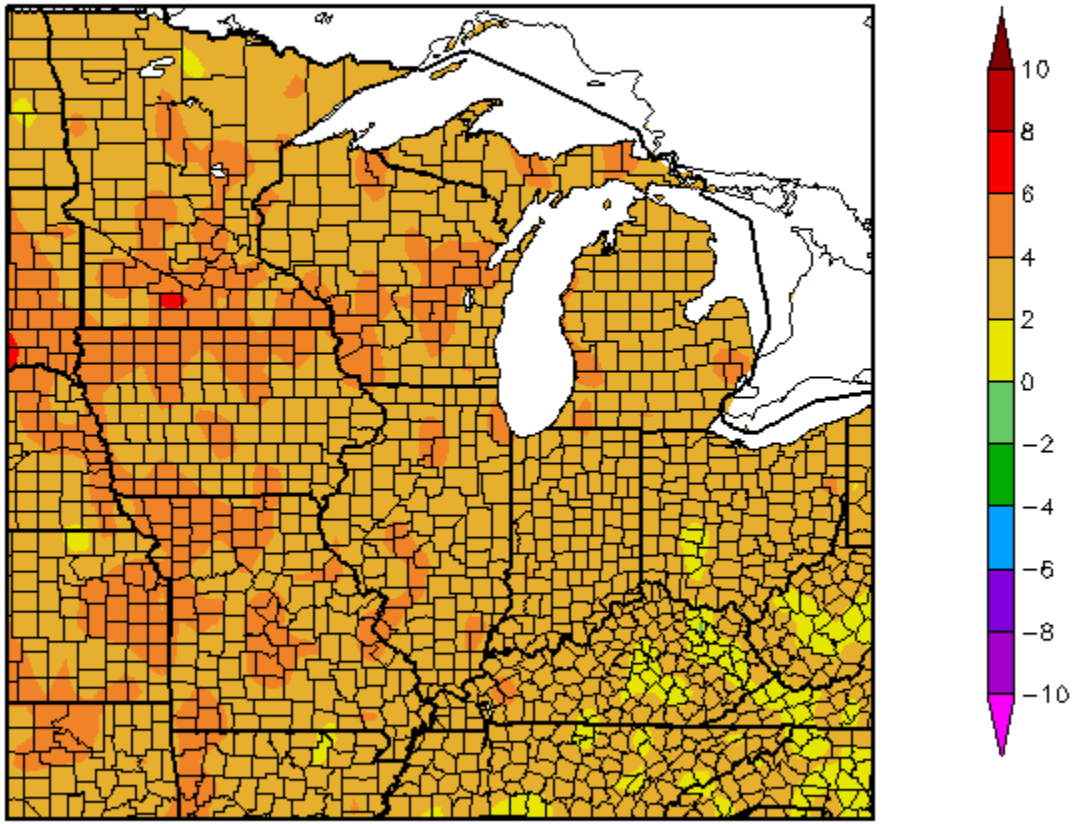
Percent of Normal Precipitation (%)
1/1/2012 – 12/31/2012



Generated 1/5/2013 at HPRCC using provisional data.

Regional Climate Centers

Departure from Normal Temperature (F)
1/1/2012 - 12/31/2012

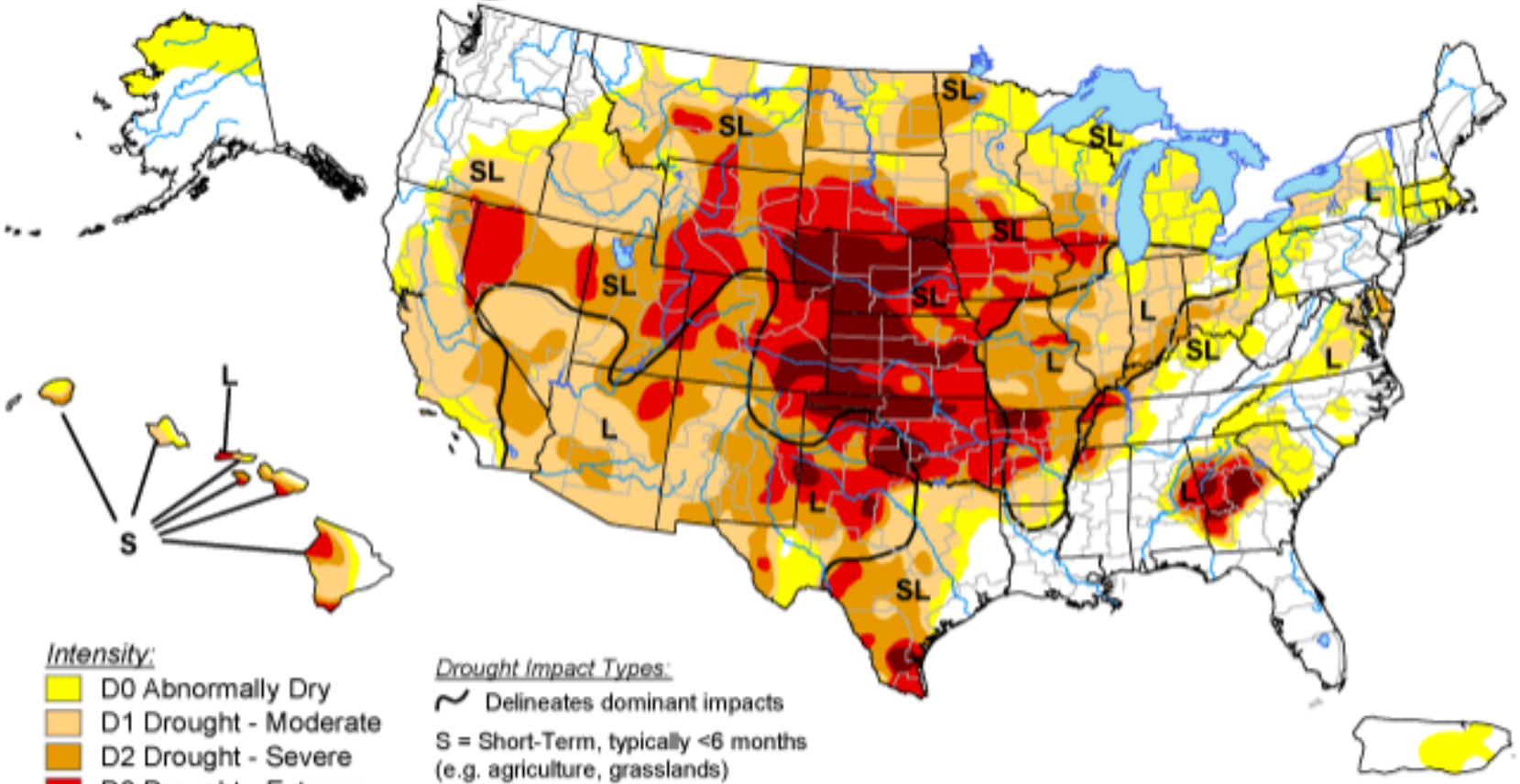


Generated 1/5/2013 at HPRCC using provisional data.

Regional Climate Centers

U.S. Drought Monitor

September 18, 2012
Valid 7 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

S = Short-Term, typically <6 months (e.g. agriculture, grasslands)

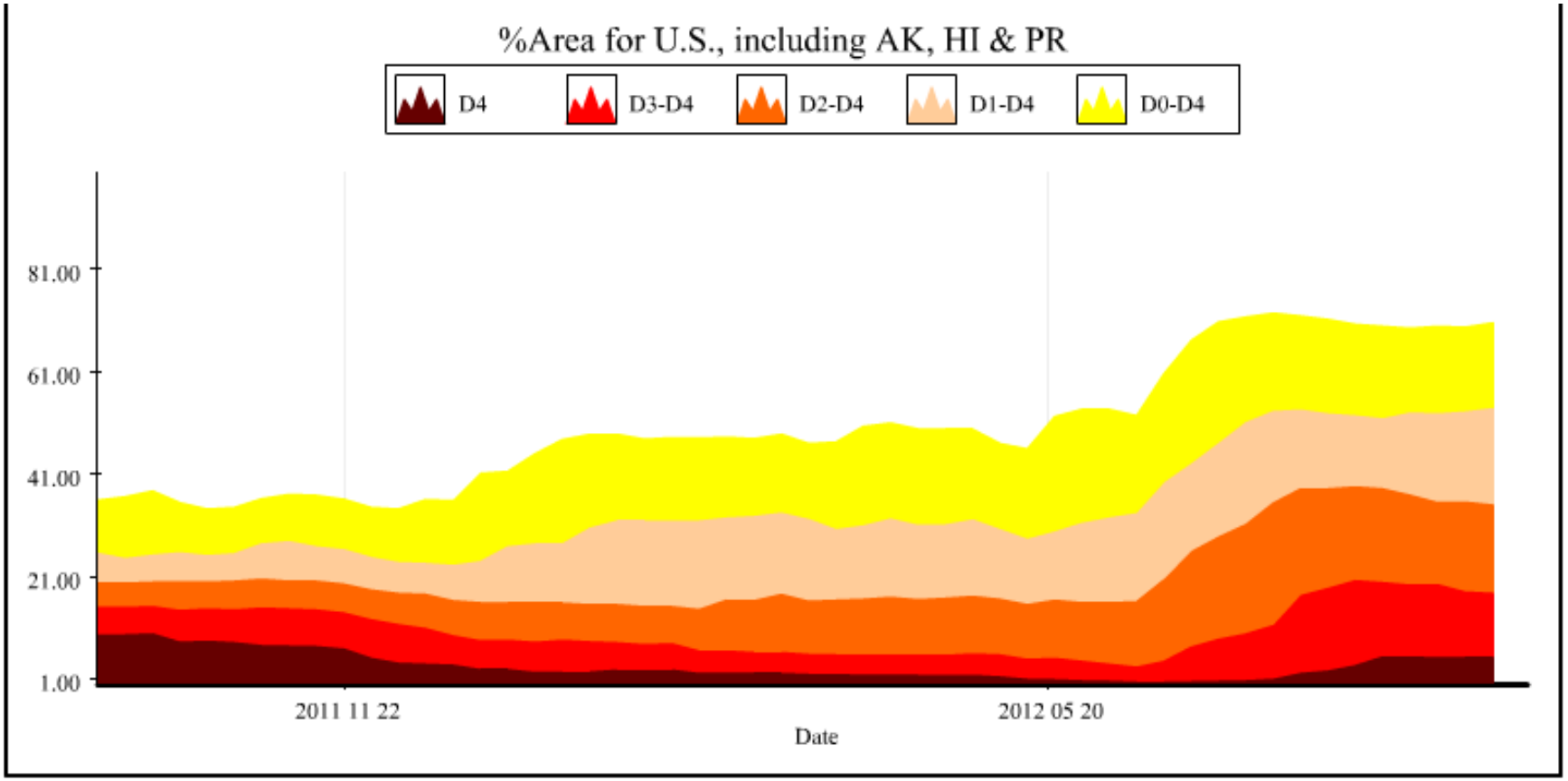
L = Long-Term, typically >6 months (e.g. hydrology, ecology)

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

USDA

National Drought Mitigation Center

Percent land area affected by Drought across US (2011- 2012)



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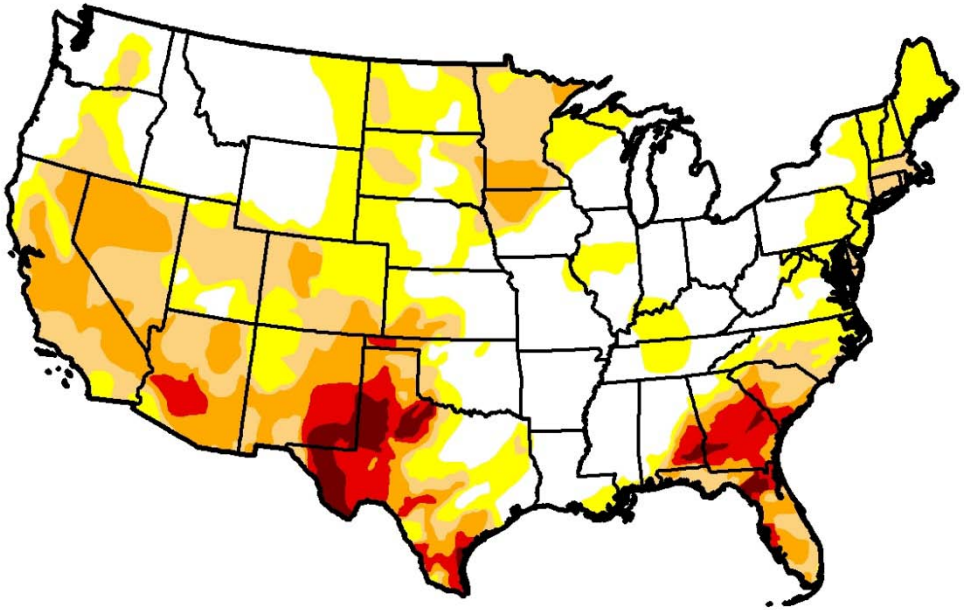

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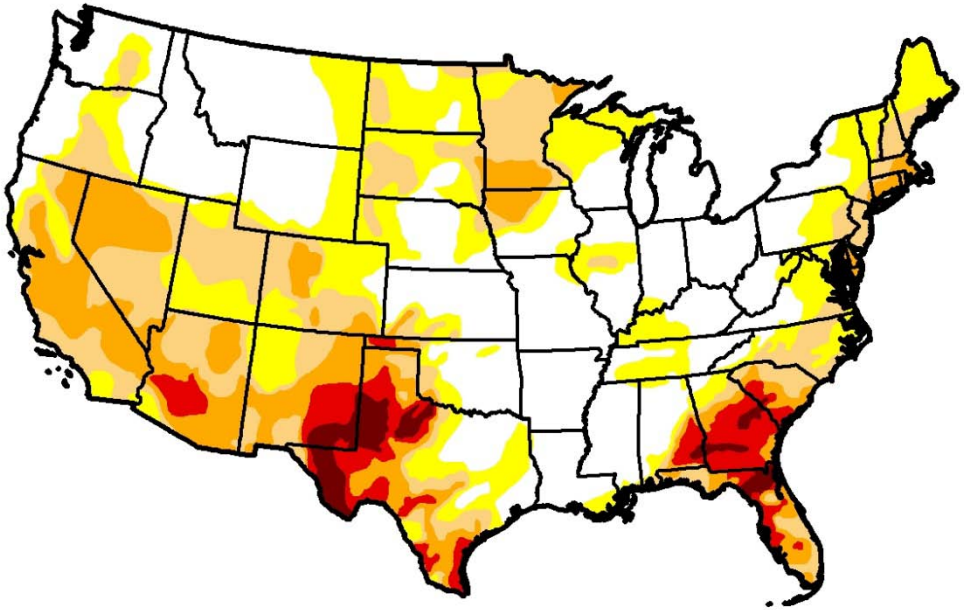
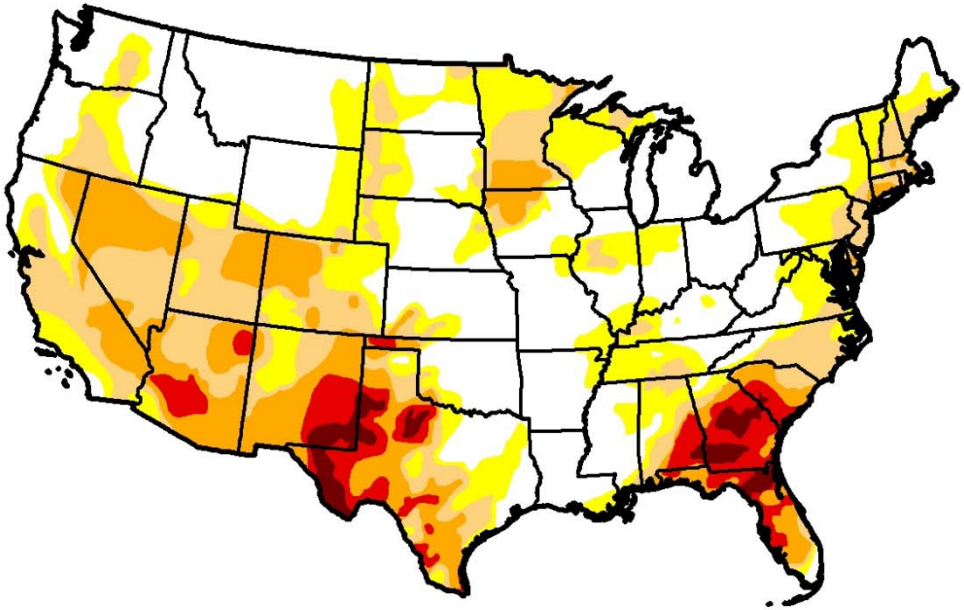


1 May 2012



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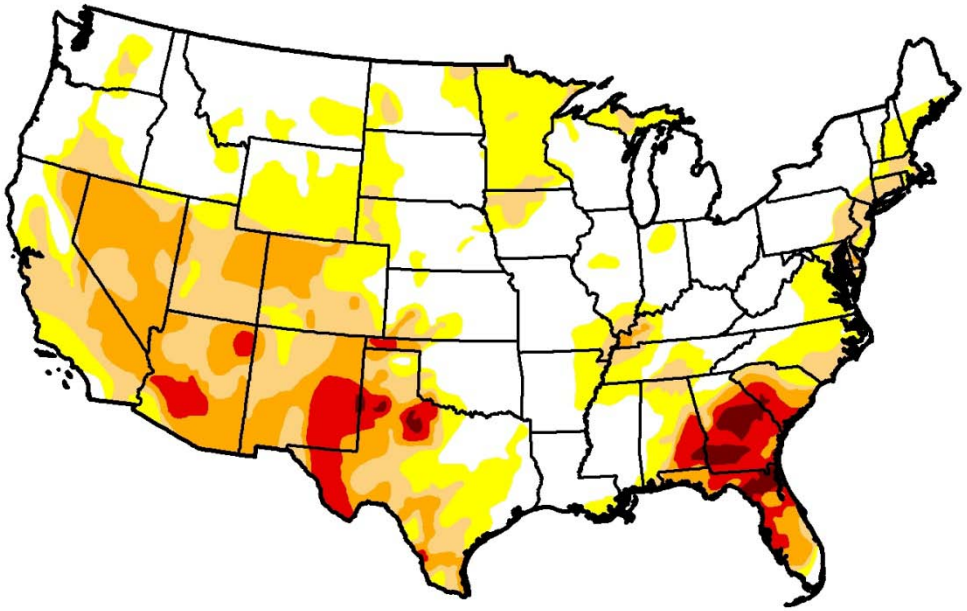

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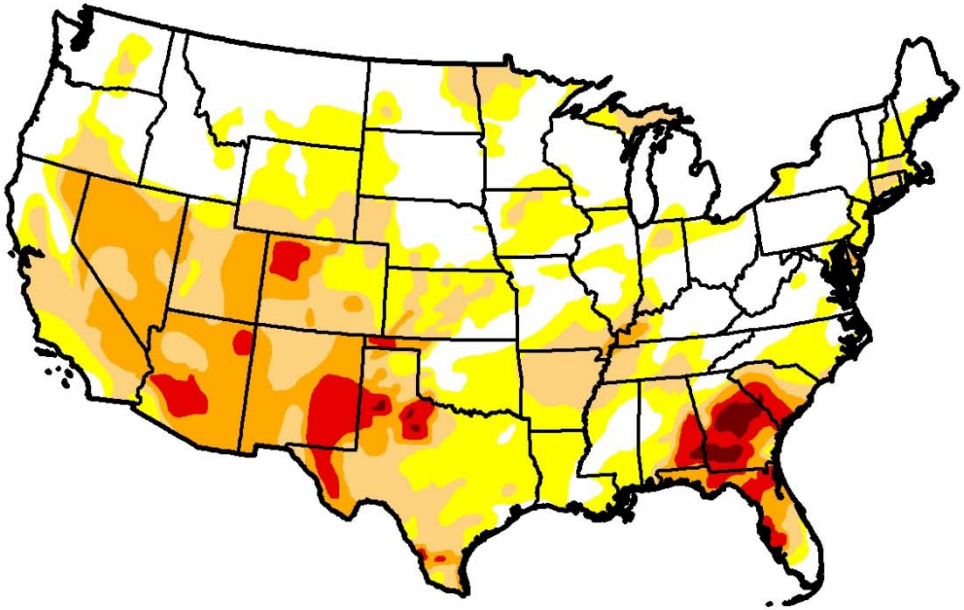

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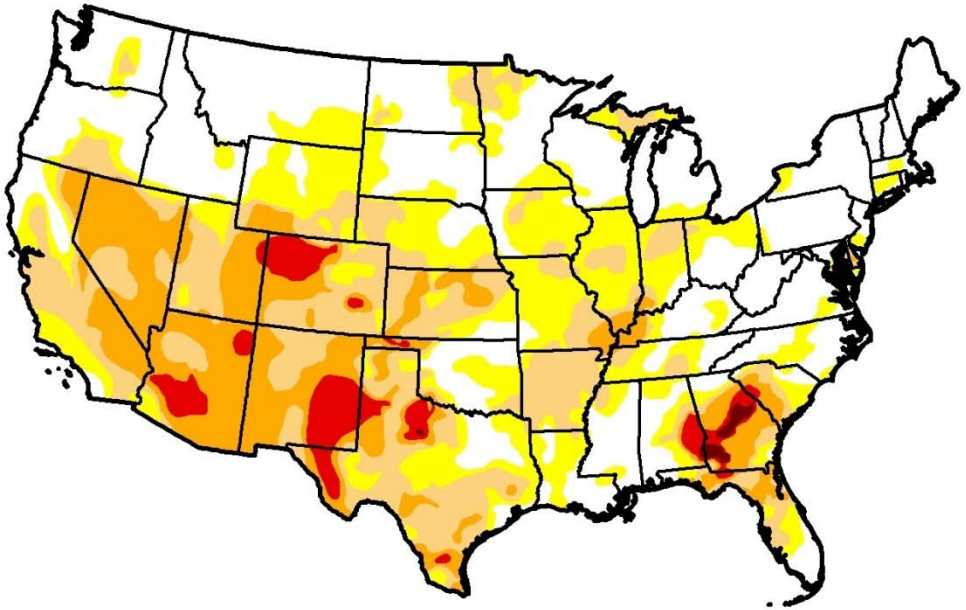

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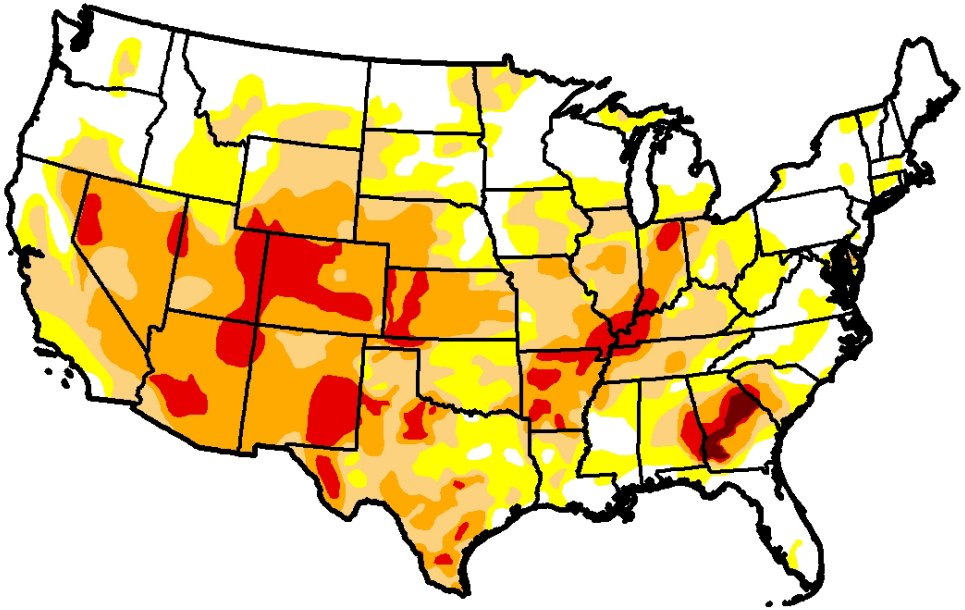

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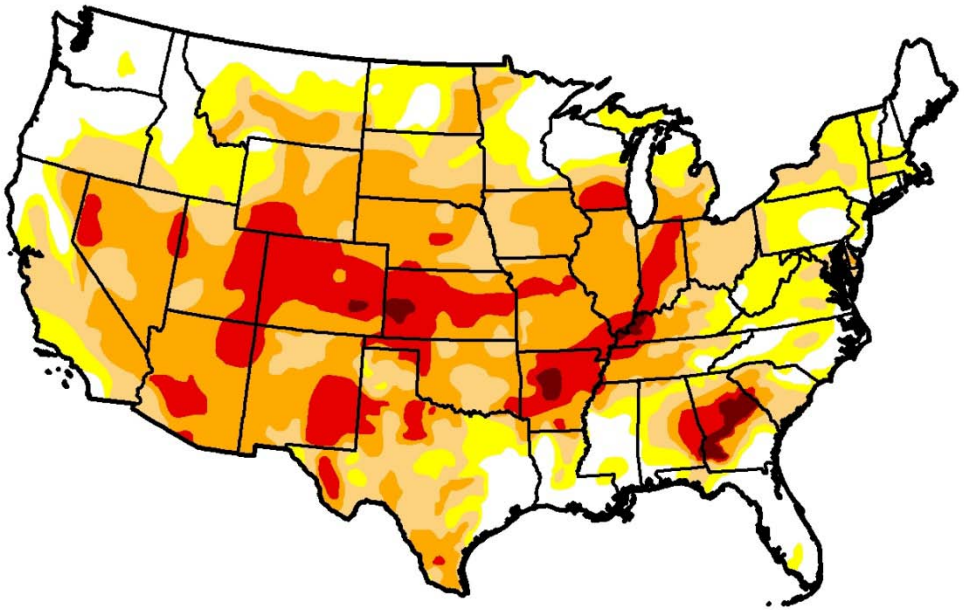

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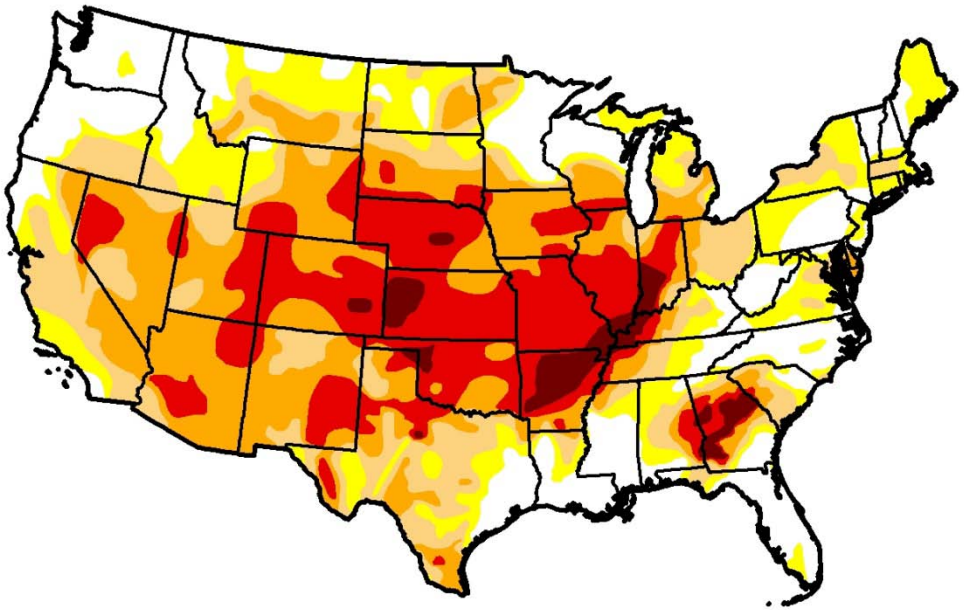

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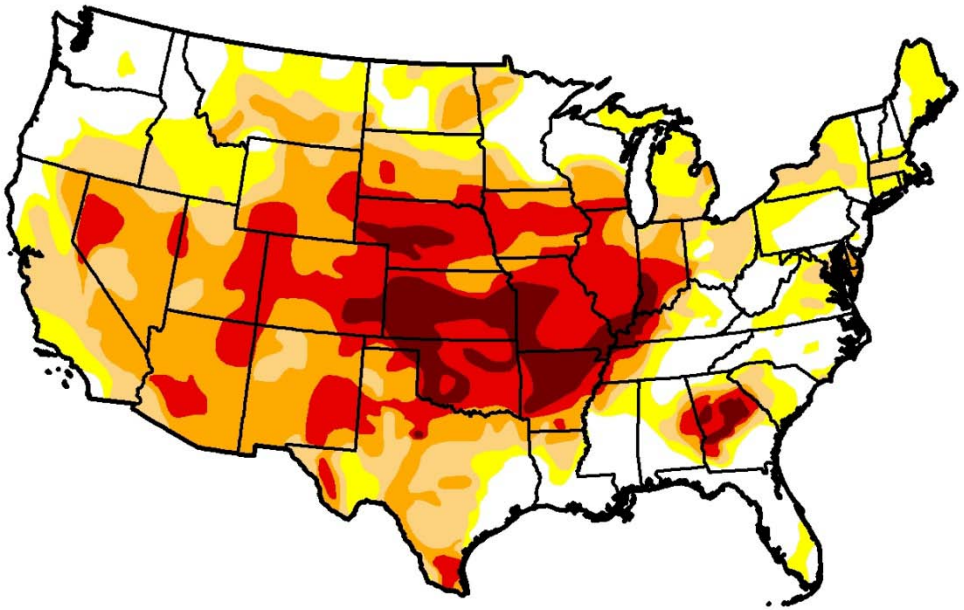

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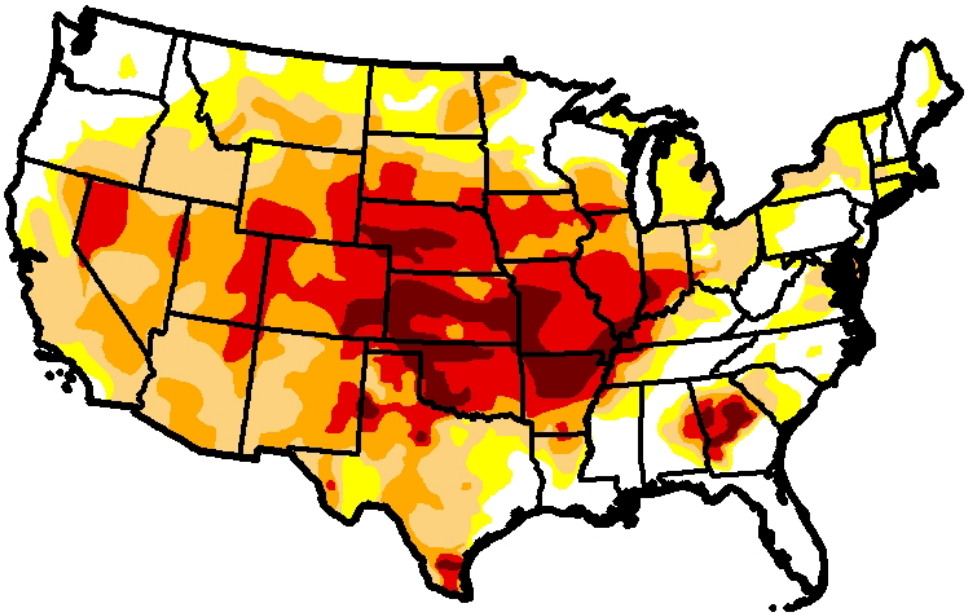

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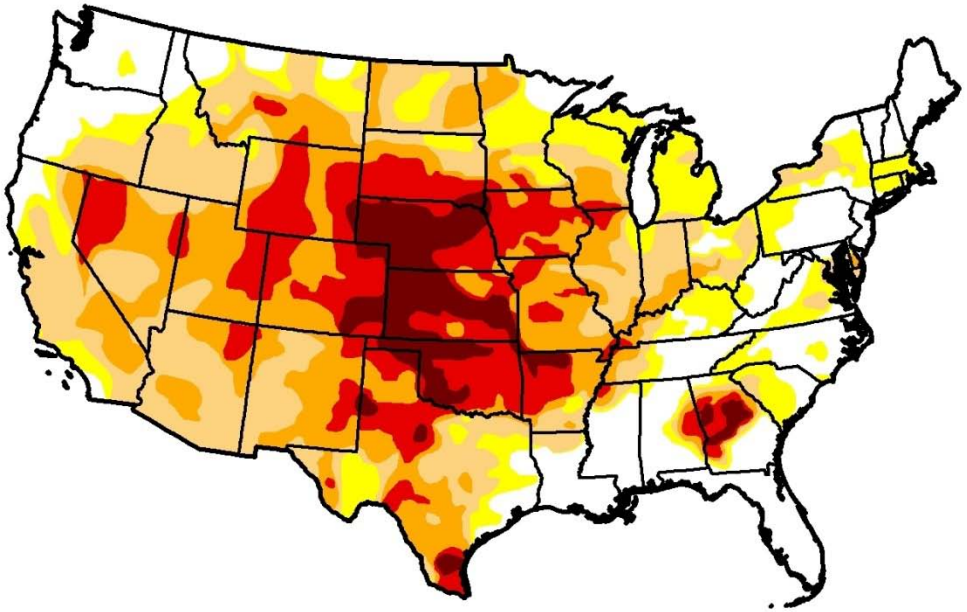

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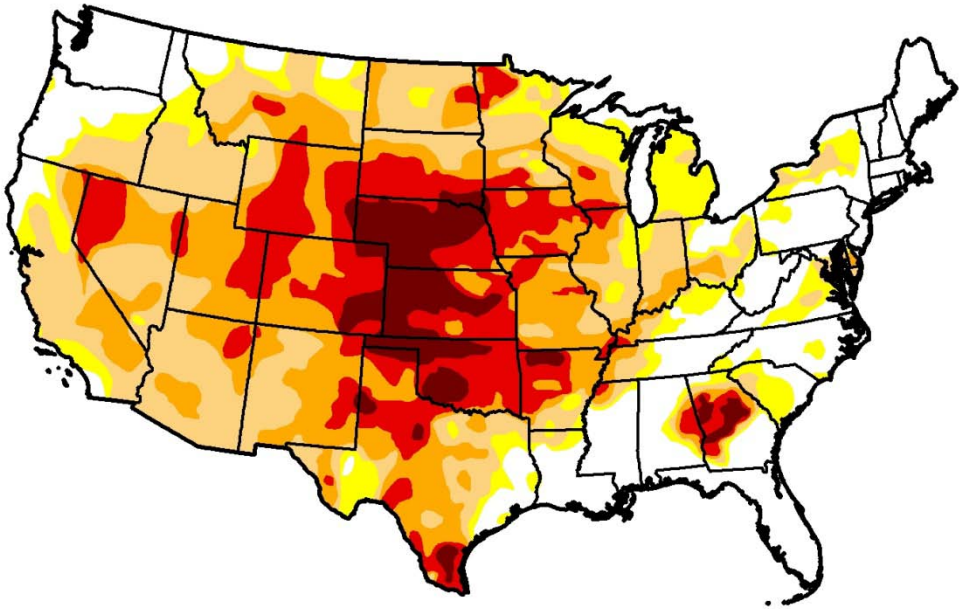

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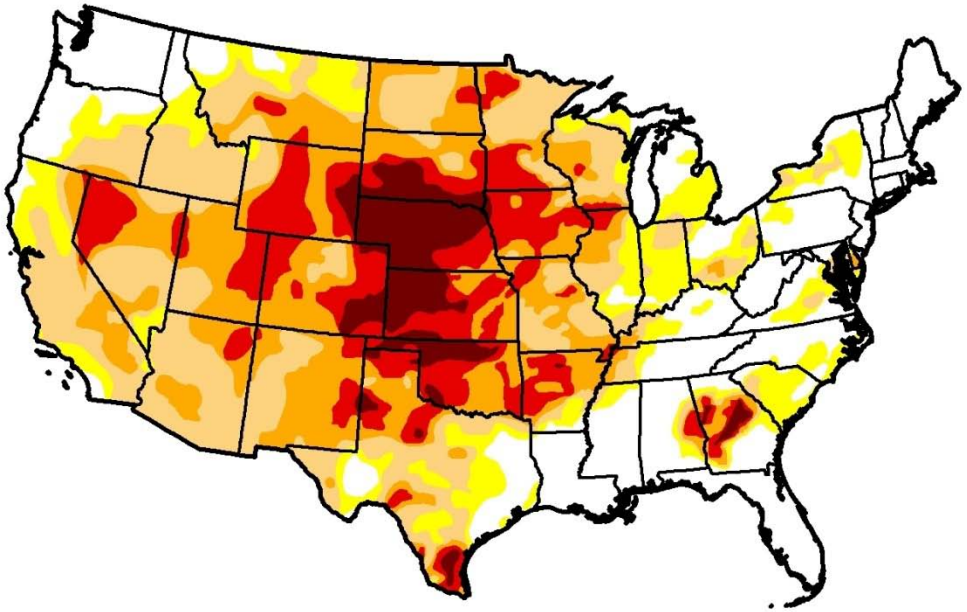

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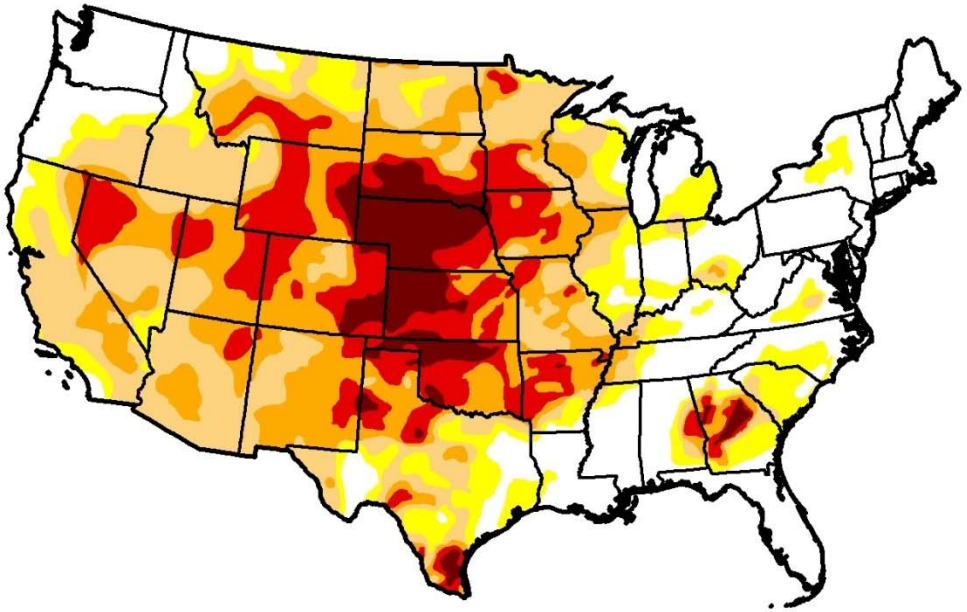

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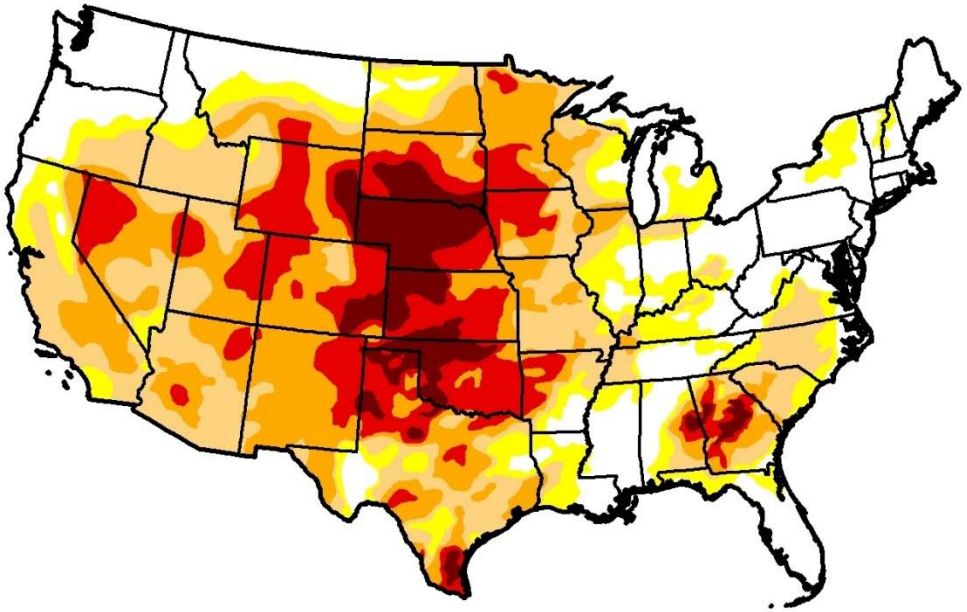

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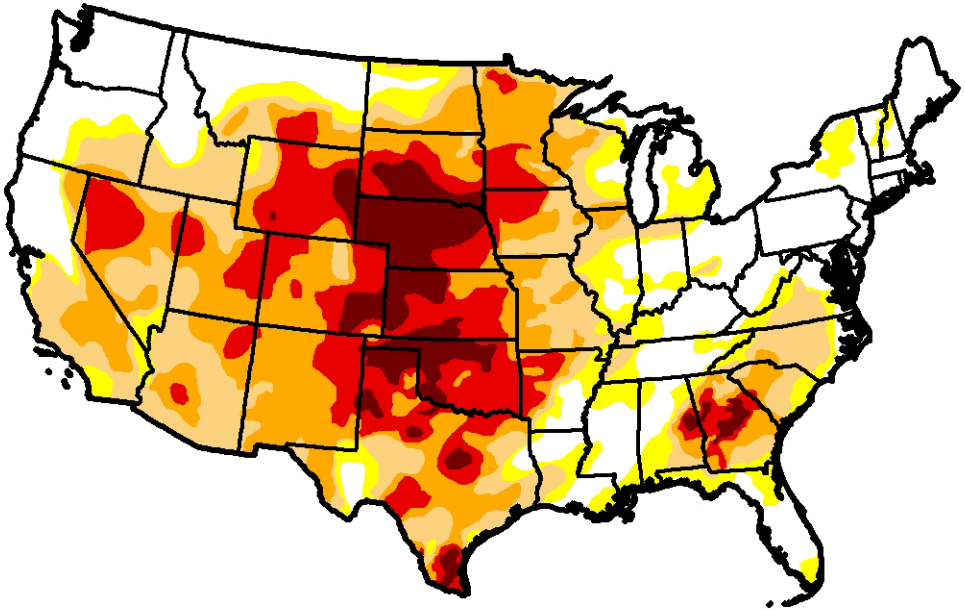

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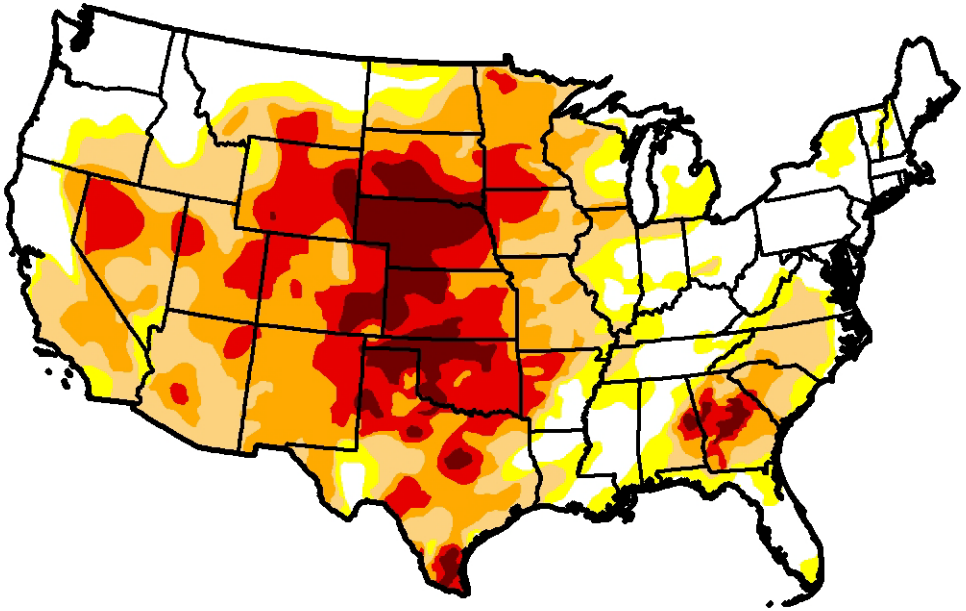

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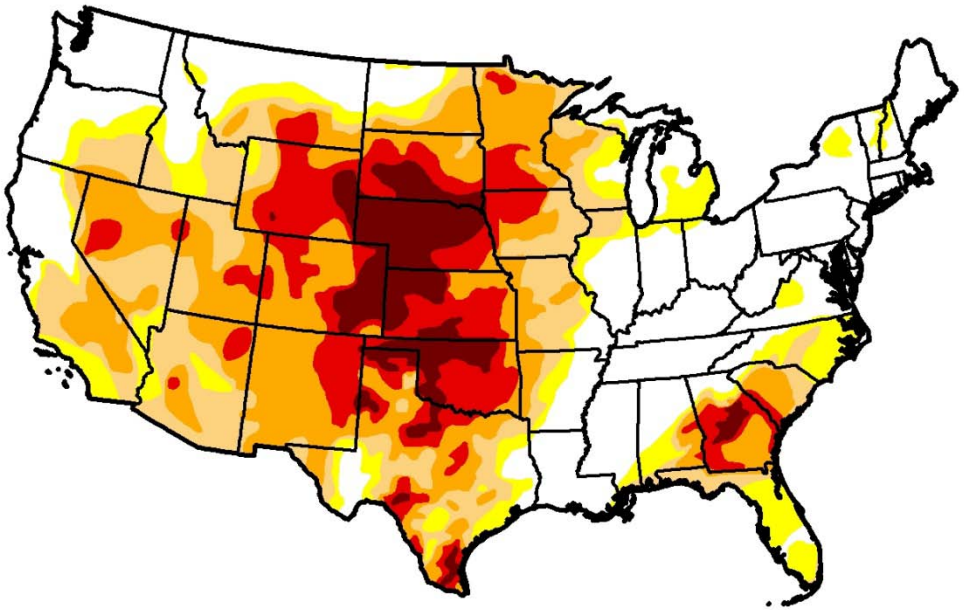

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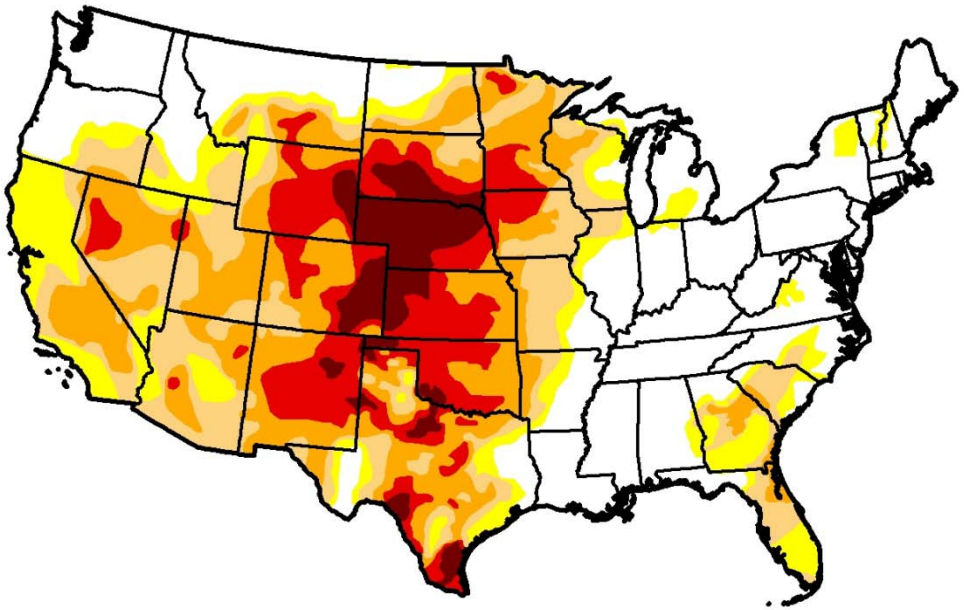
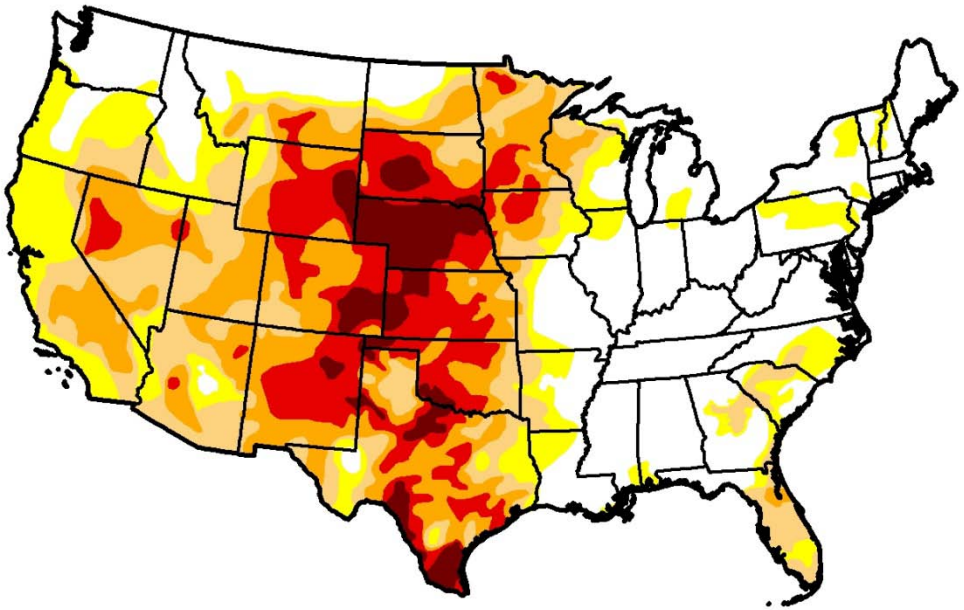
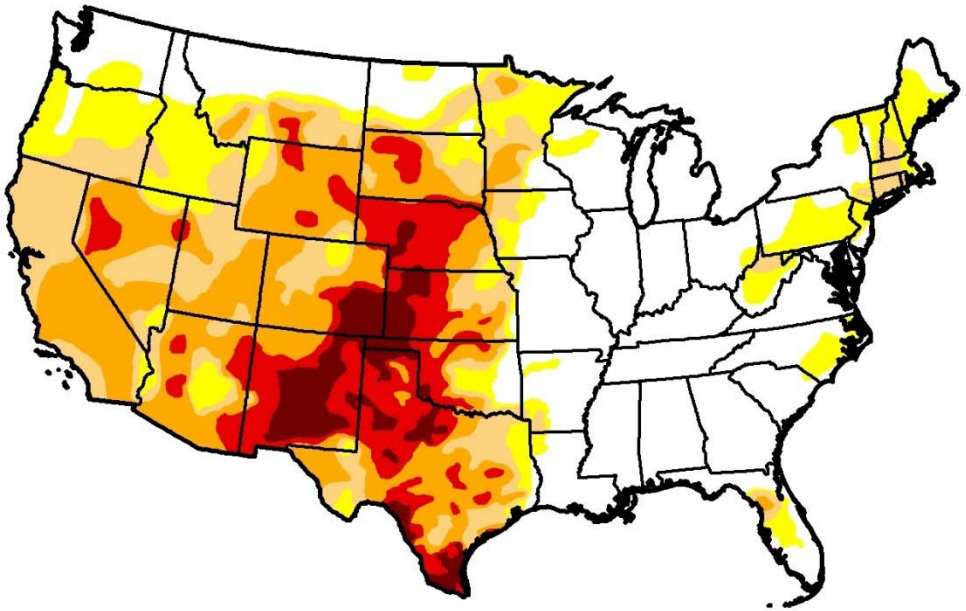


2 April 2013



7 May 2013



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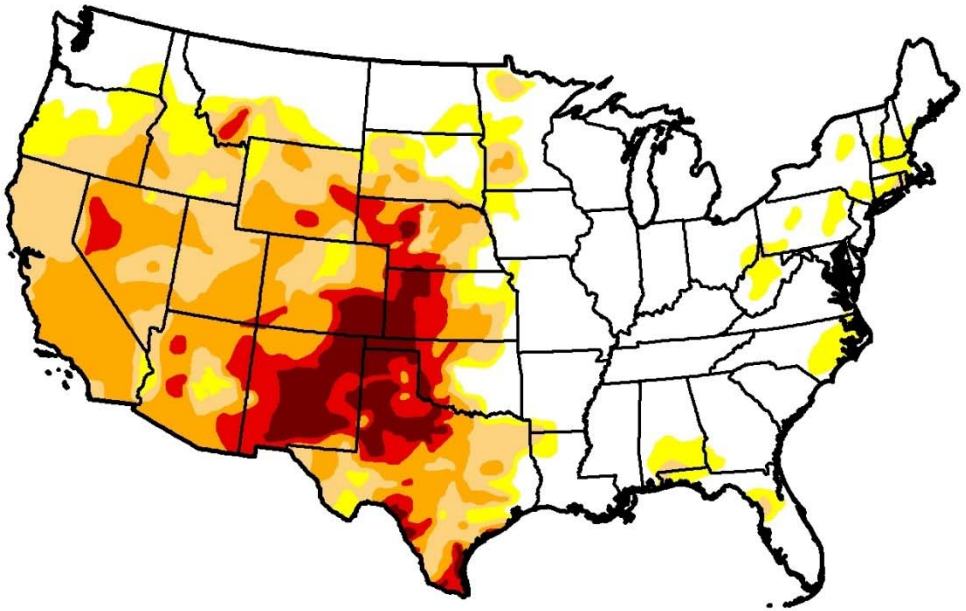

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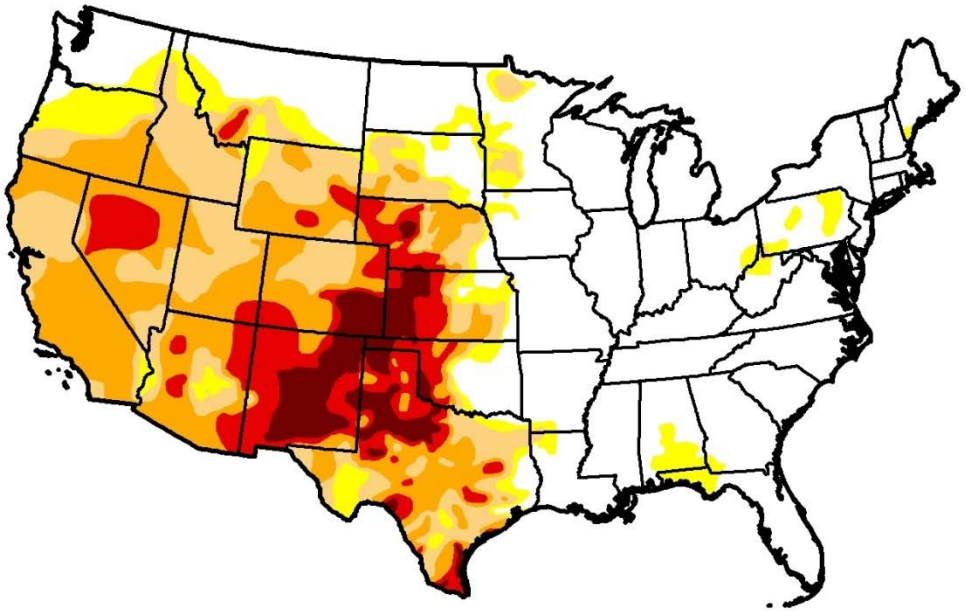
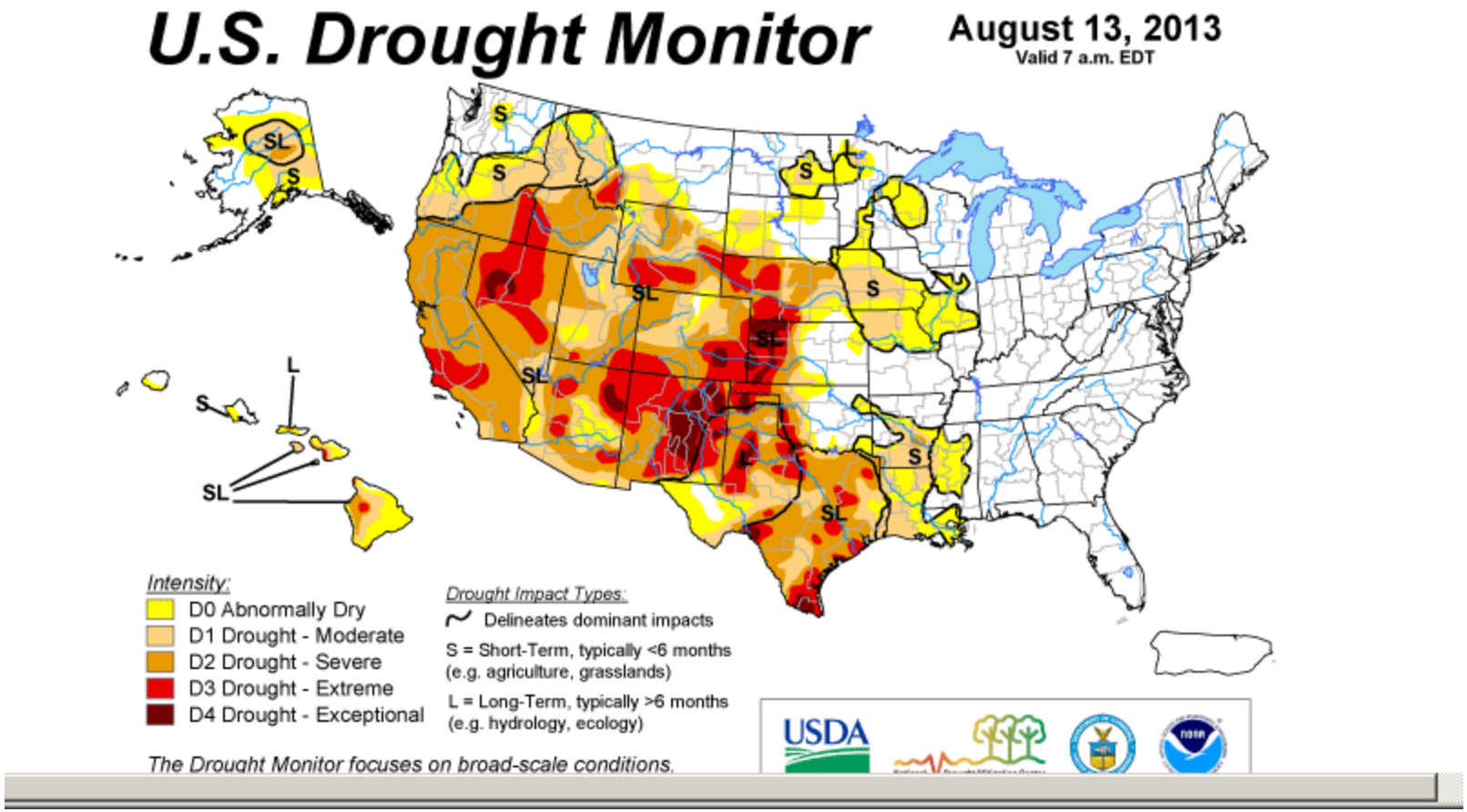


Current Drought Conditions

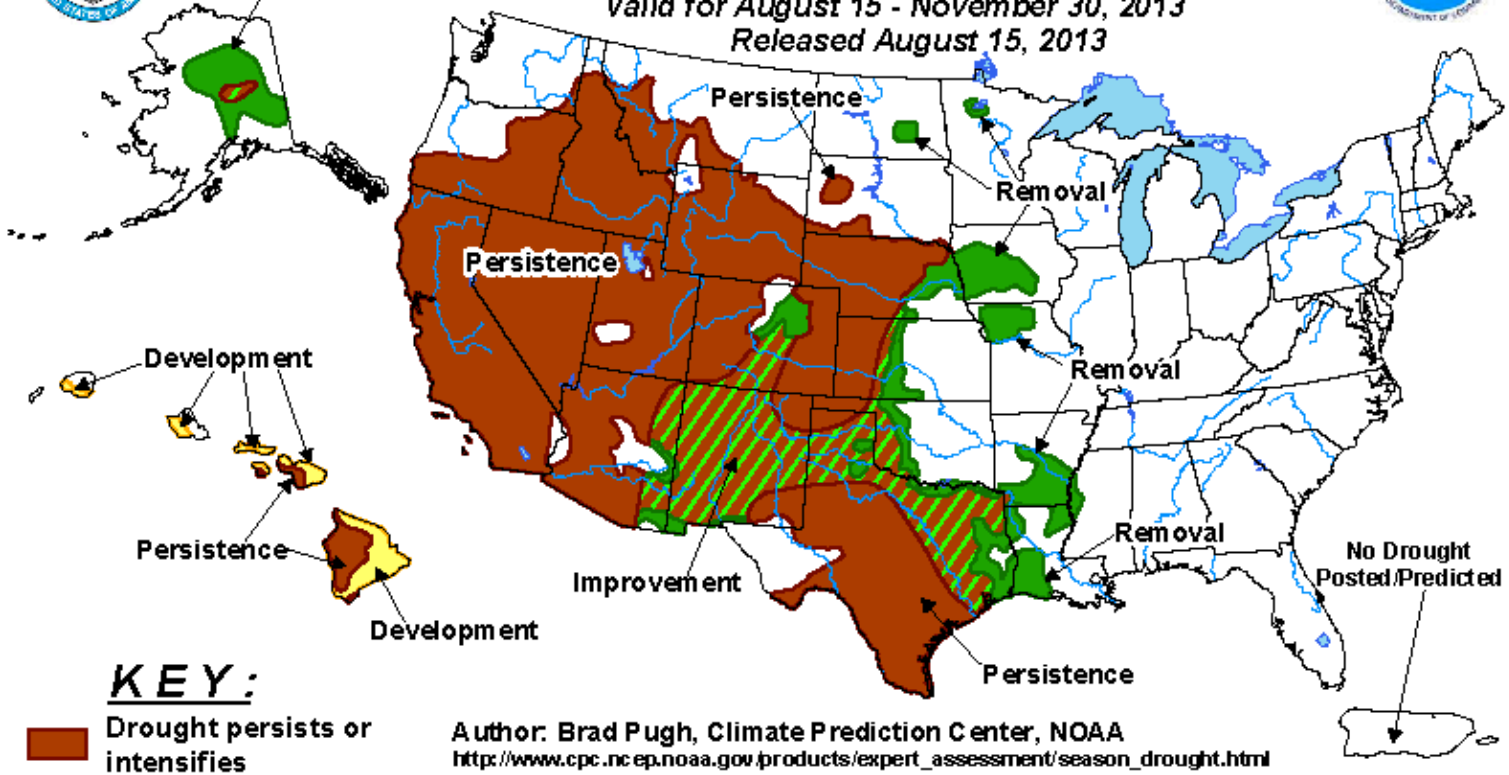


U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for August 15 - November 30, 2013

Released August 15, 2013



KEY:

- **Drought persists or intensifies**
- **Drought remains but improves**
- **Drought removal likely**
- **Drought development likely**

Author: Brad Pugh, Climate Prediction Center, NOAA
http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.html

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

NOTE: The Green and Brown hatched areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The Green areas imply drought removal by the end of the period (D0 or none)

2013 Summary

- **Temperatures much closer to normal overall (when averaged over time):**
  - January, May warmer than normal
  - March, July cooler than normal
  - February, August on track/near normal

- **Seesaw pattern of wetter than normal and drier than normal conditions:**
  - January , April, June wetter than normal
  - February near normal
  - March, May, July, August drier than normal

January-August 2013

Indiana Mean Temperatures (1971-2000 normals)

- January: 29.9°F (normal: 26.0°F)
- February: 30.6°F (normal: 30.5°F)
- March: 35.3°F (normal: 40.8°F)
- April: 50.8°F (normal: 51.1°F)
- May: 64.3°F (normal: 61.5°F)
- June: 70.8°F (normal: 70.6°F)
- July: 72.3°F (normal: 74.4°F)
- August: *Aug. 1-17, 2013 @ Indianapolis:* 72.3°F (normal: 72.3°F)

Temperatures much closer to normal Than 2012….

Indiana Mean Precipitation (1971-2000 normals)

- January: 4.88 inches (normal: 2.44 in.)
- February: 2.33 inches (normal: 2.31 in.)
- March: 2.32 inches (normal: 3.40 in.)
- April: 6.60 inches (normal: 3.96 in.)
- May: 3.61 inches(normal: 4.47 in.)
- June: 6.57 inches(normal: 4.25 in.)
- July: 3.19 inches (normal: 4.19 in.)
- August: *Aug. 1-17, 2013 @ Indianapolis:* 0.85 inches (normal: 3.88 in.)

Seesaw pattern of wetter than normal then drier than normal….

January-August2012

Indiana January-April 2012 Mean Temperatures (1971-2000 normals)

- January: 32.1°F (normal: 26.0°F)
- February: 34.6°F (normal: 30.5°F)
- March: 54.9°F (normal: 40.8°F)
- April: 52.9°F (normal: 51.1°F)
- May: 67.4 °F (normal: 61.5°F)
- June: 71.4°F (normal: 70.6°F)
- July: 80.1°F (normal: 74.4°F)
- August: 72.0°F (normal: 72.3°F)

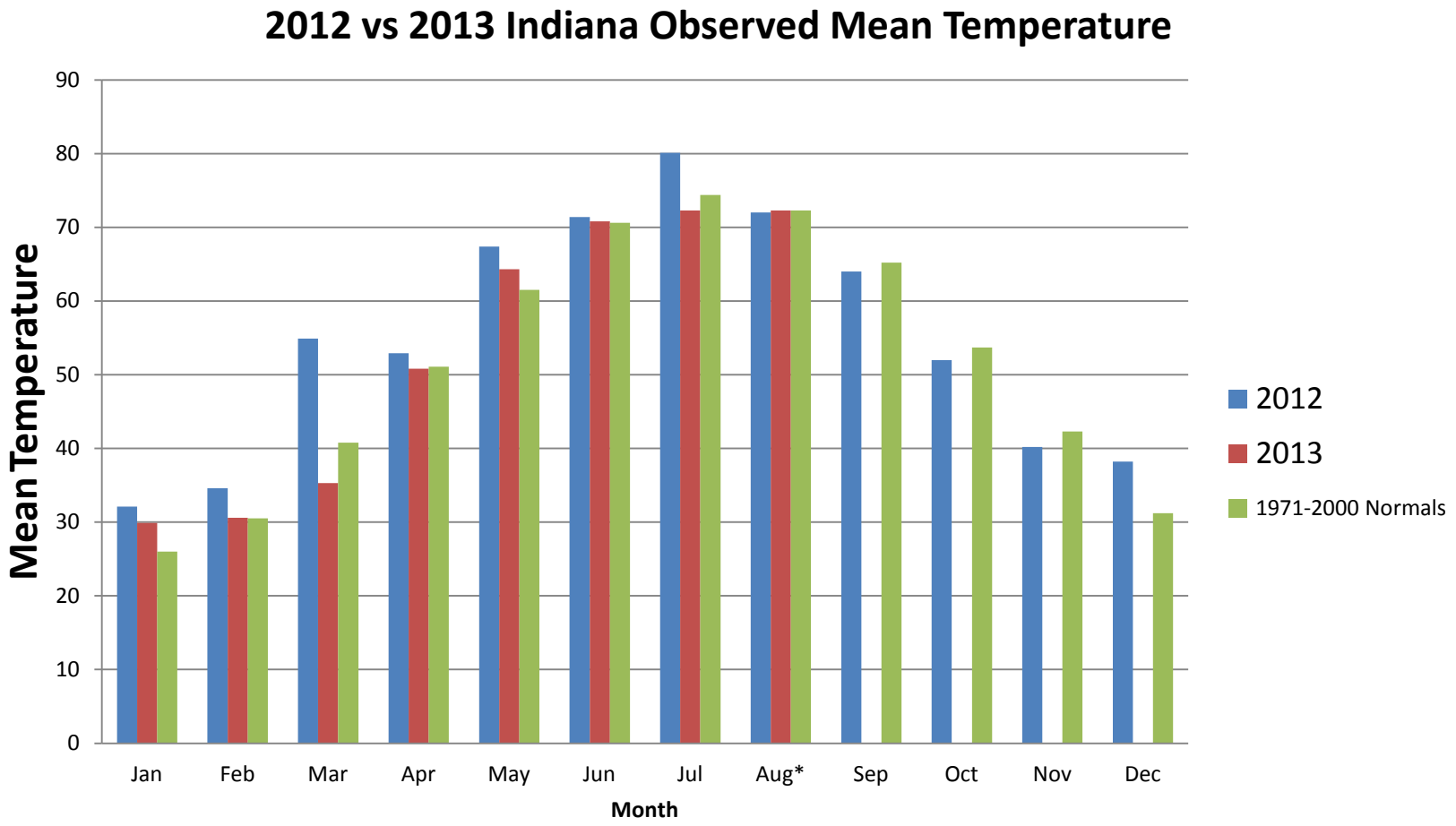
WARMER THAN NORMAL!

Indiana January-April 2012 Precipitation (1971-2000 normals)

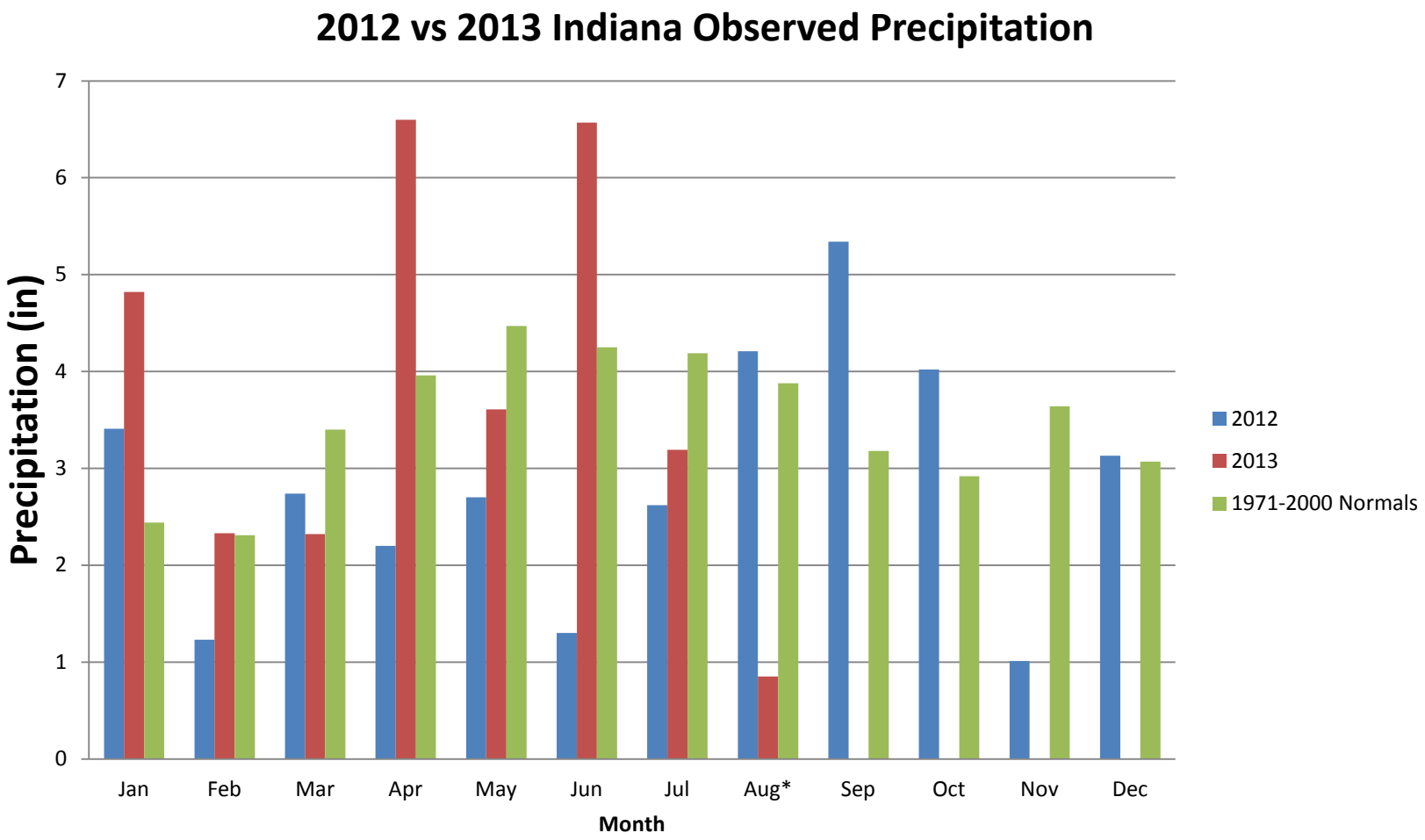
- January: 3.41 inches (normal: 2.44 in.)
- February: 1.23 inches (normal: 2.31 in.)
- March: 2.74 inches (normal: 3.40 in.)
- April: 2.20 inches (normal: 3.96 in.)
- May: 2.70 inches (normal: 4.47 in.)
- June: 1.30 inches (normal: 4.25 in.)
- July: 2.62 inches (normal: 4.19 in.)
- August: 4.21 inches (normal: 3.88 in.)

MUCH DRIER THAN NORMAL till August when recovery begins…

2012 vs. 2013



* Denotes that August data is not complete and value could change.



* Denotes that August data is not complete and value will change.

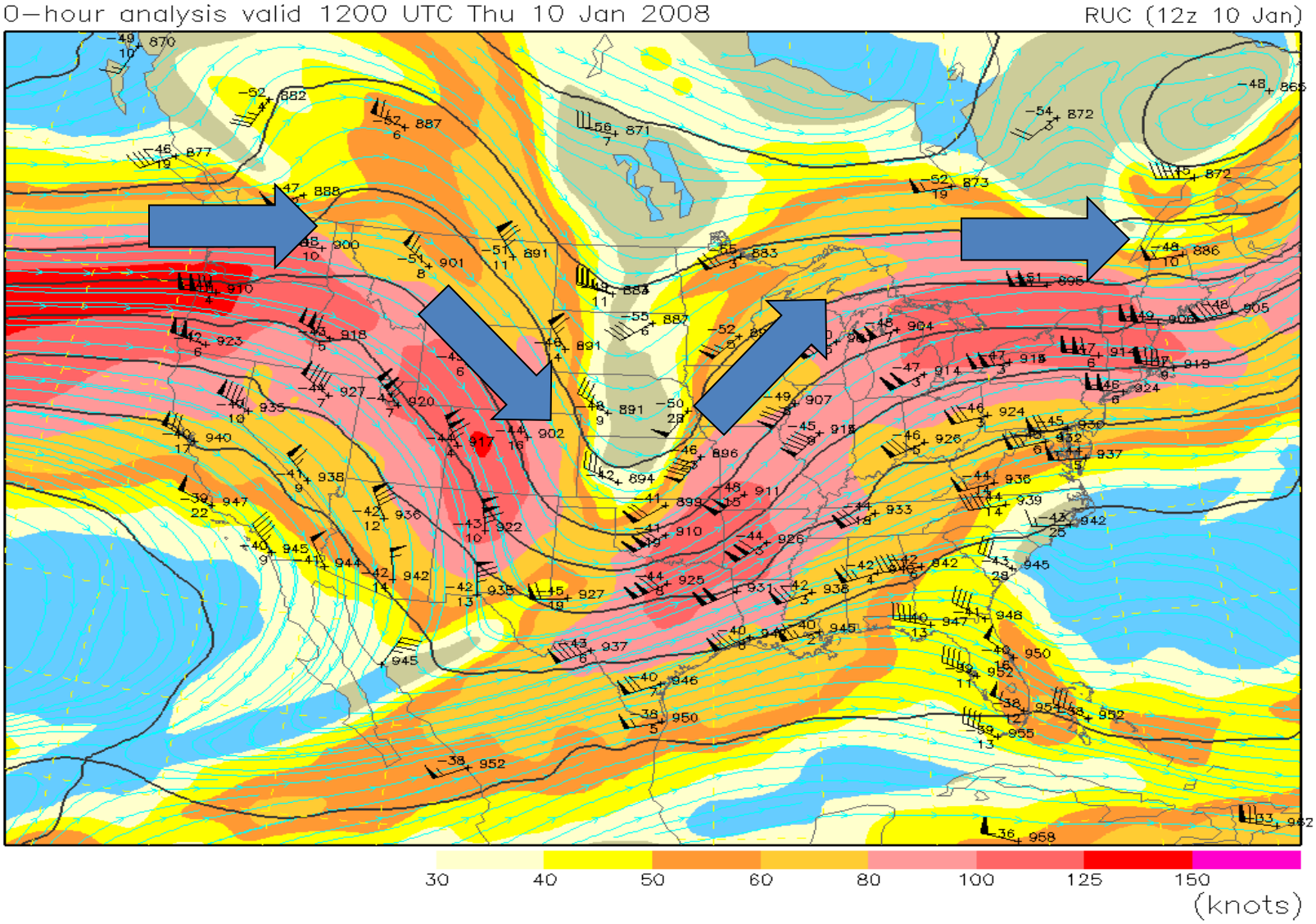
Long Range Weather Outlooks

Factors to Consider

A critical factor in long range forecasting is knowing what is going on in the upper atmosphere, especially the path of the

jet stream

Jet stream is the wind "jet" typically around 33000 ft. (near tropopause)



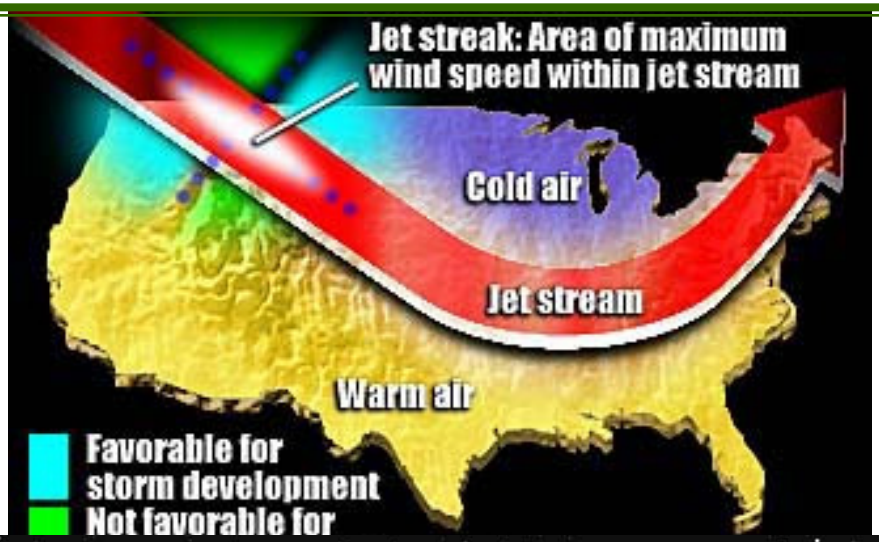
Jet stream acts as the weather conveyer belt in the atmosphere

Jet streams divide cold polar air masses from warm tropical air masses

Storms (low pressure systems) often ride on top of jet stream

Storm systems stretch vertically into the upper atmosphere, not just at ground level where we see them

Upper atmospheric low pressure systems determine path of storms at earth's surface

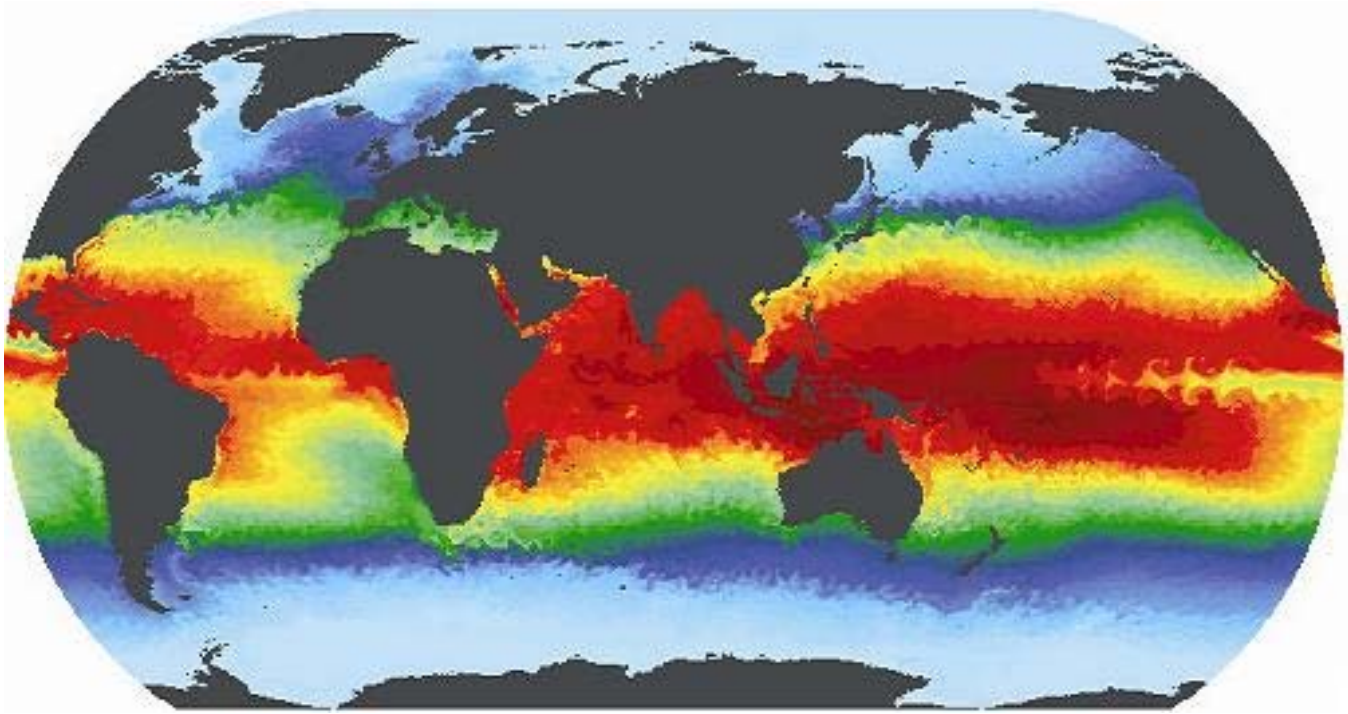


The weather patterns are globally connected

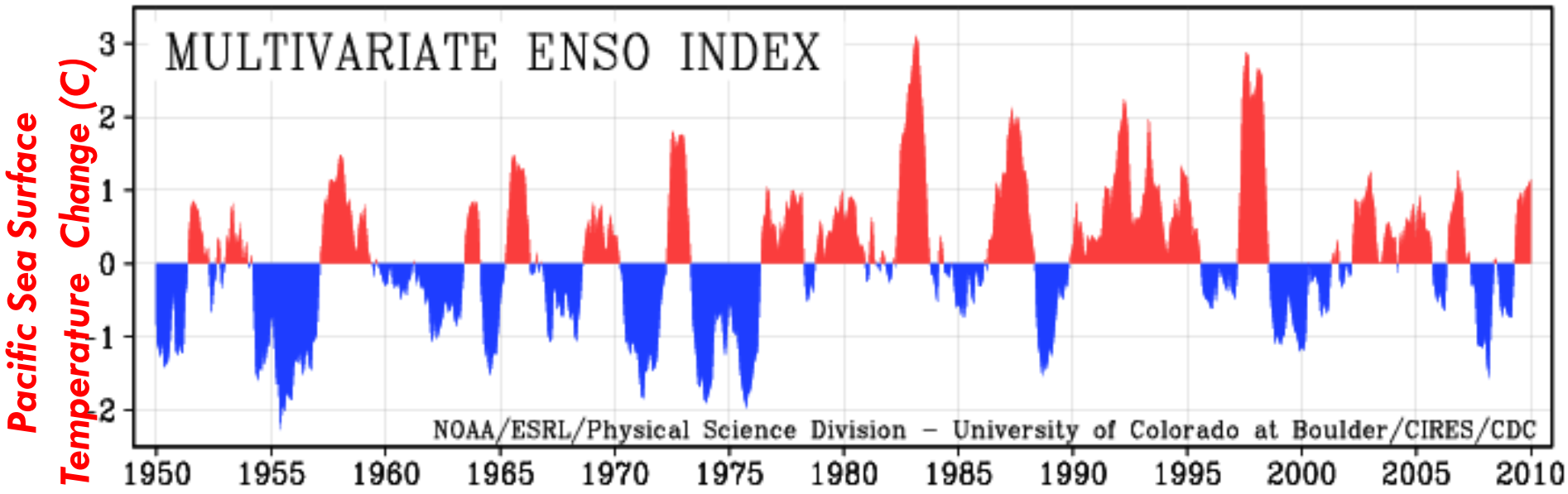
(e.g. south Asian forest fires can cause air pollution over California in about 2 weeks; tropical wave in Africa can be altered by south America and alter weather in US, etc)

Another important factor in long range forecast is earth's heat storage container, its **oceans** especially the deviation from normal of the "sea surface temperatures" (SSTs) in the top 1000 feet

- **Ocean temperatures change due to winds, circulation, salinity change and cold and warm waters mixing / density changes**



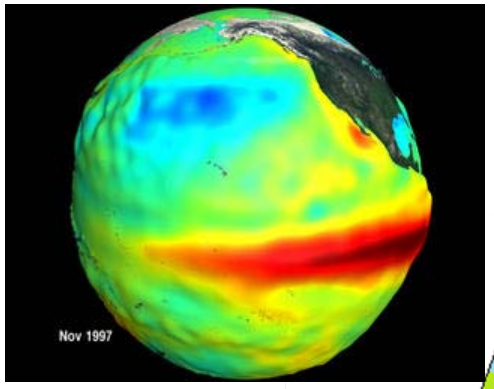
Climate Variability - El Nino / La Nina time series

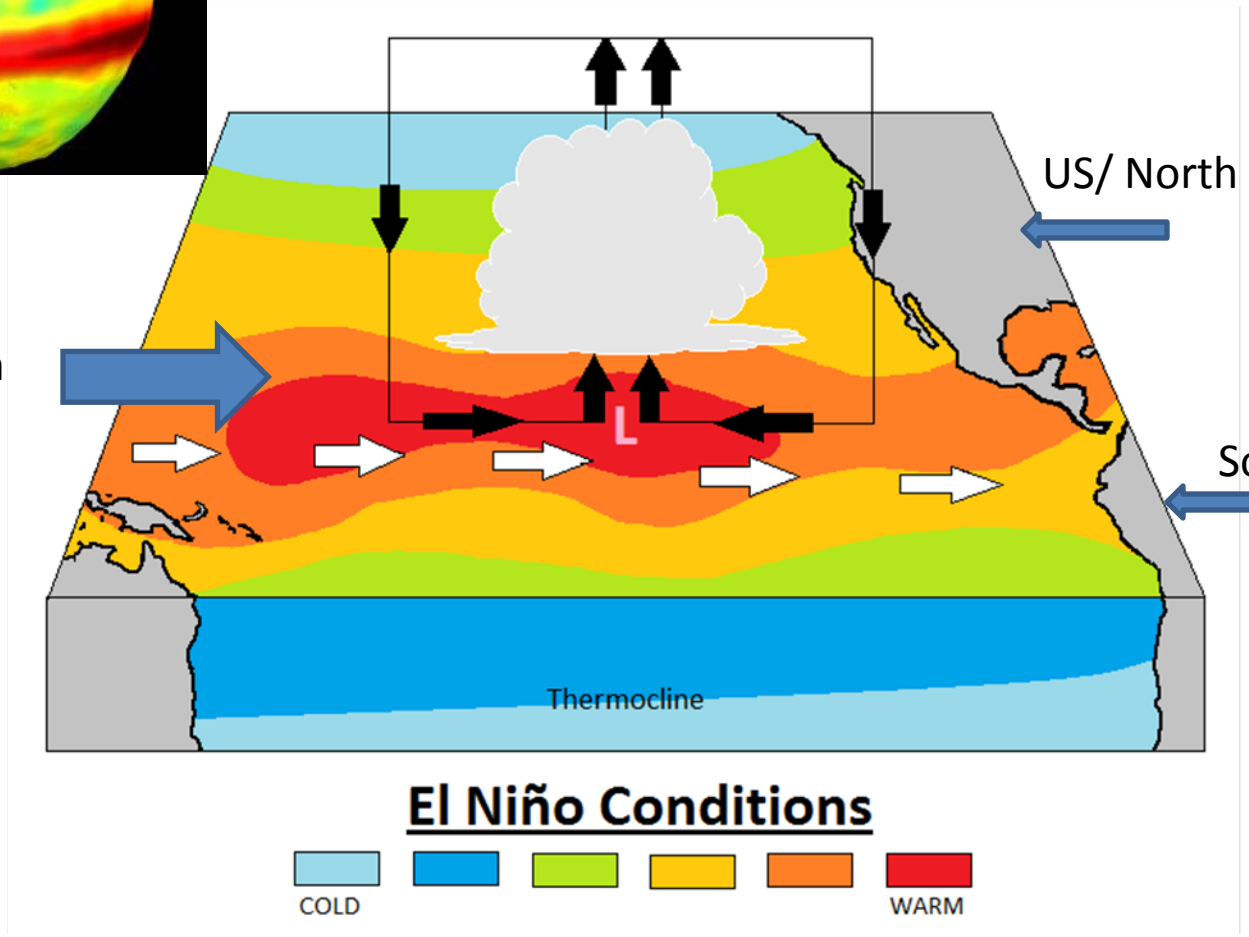


Variability in Pacific Sea Surface Temperature from 1950.

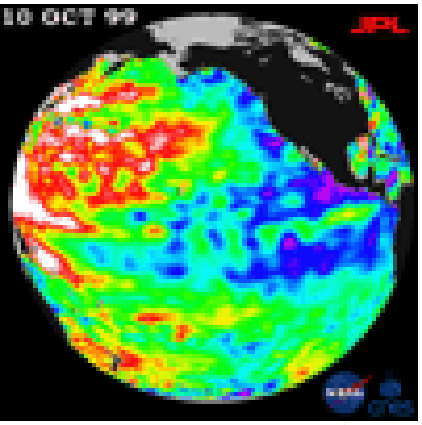
If the SSTs in the region rise 0.5°C above normal for five consecutive three-month seasons then the event is considered an El Niño. If they fall 0.5°C or more below normal then it is classified as a La Niña.

El Nino


Nov 1997


US/ North America
Pacific Ocean
South America
L
Thermocline
El Niño Conditions
COLD
WARM

La Nina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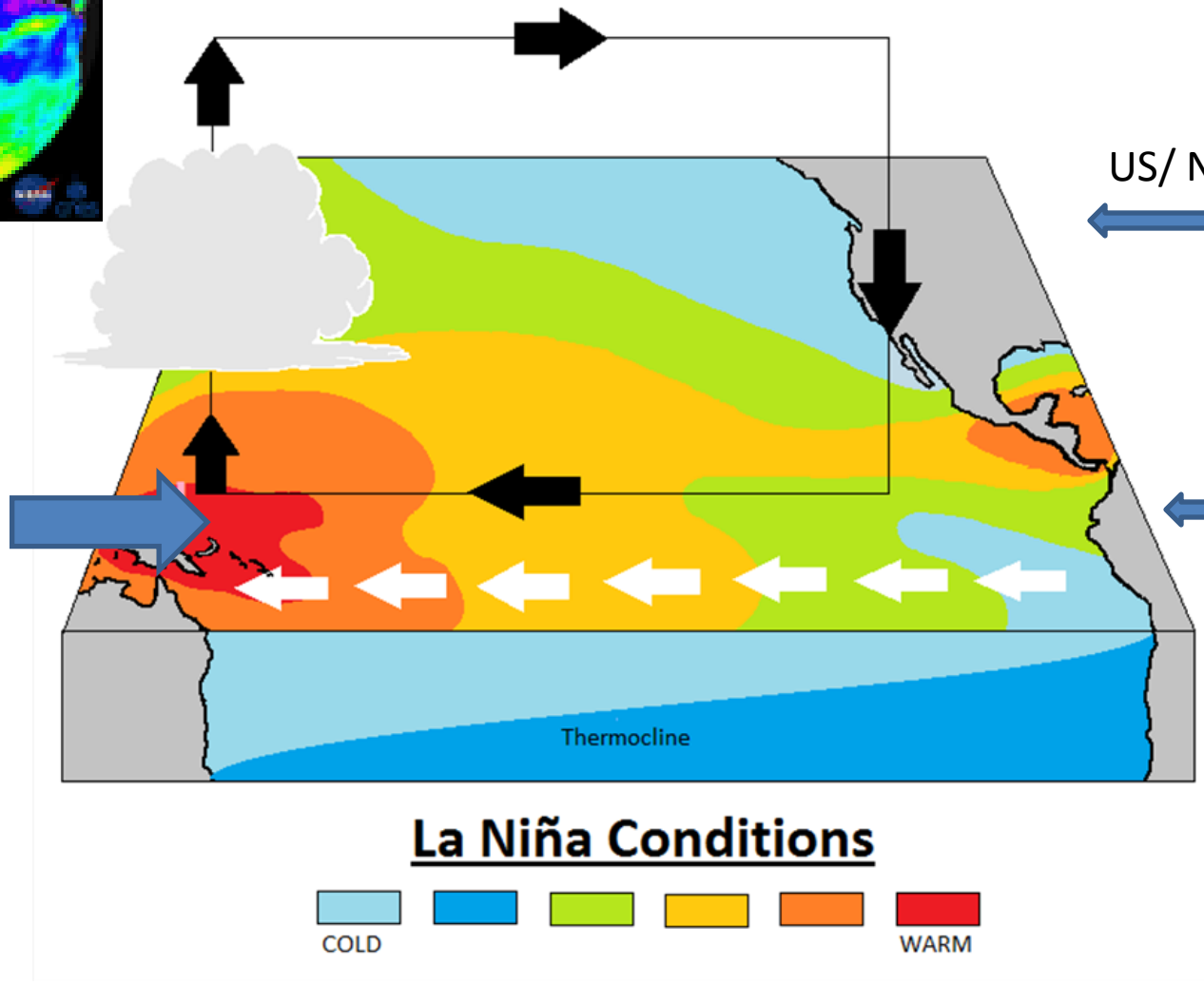
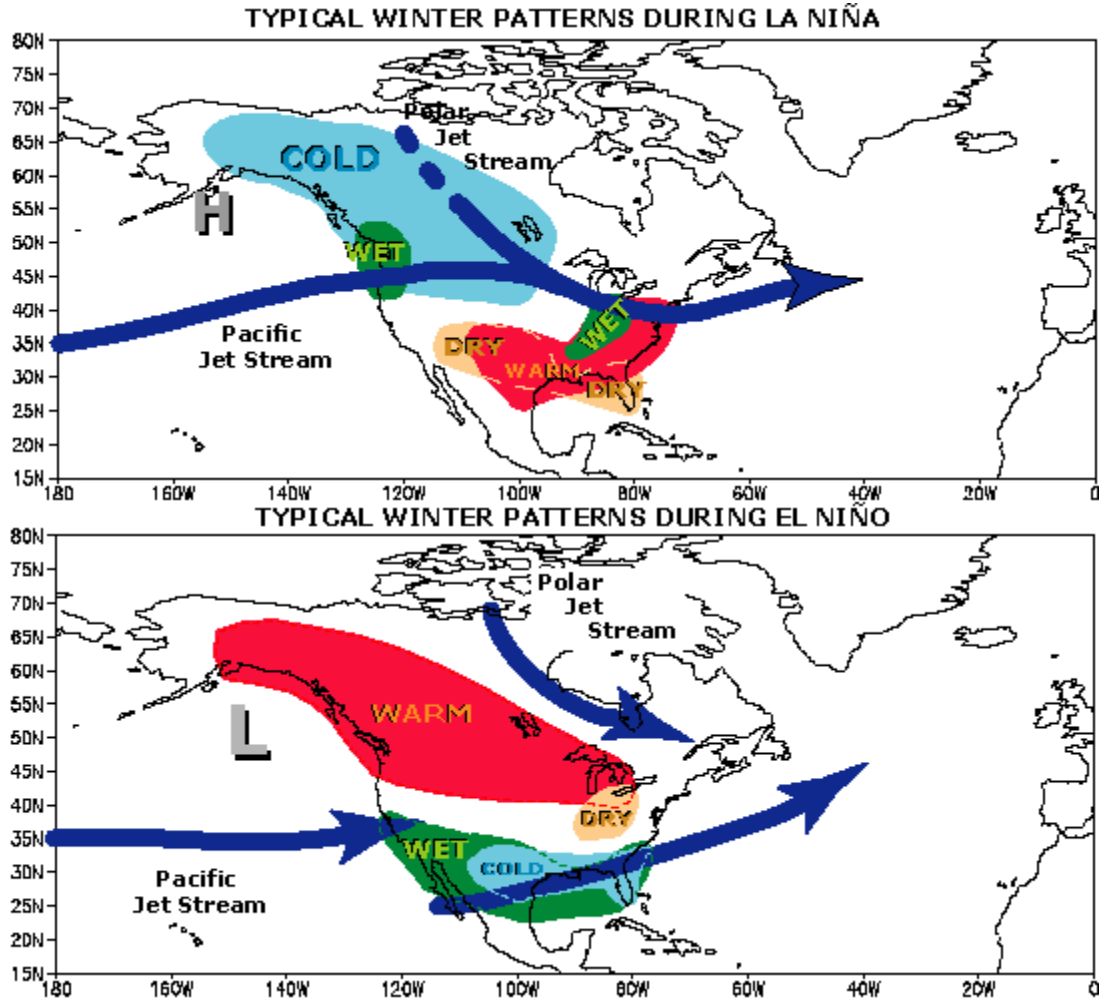
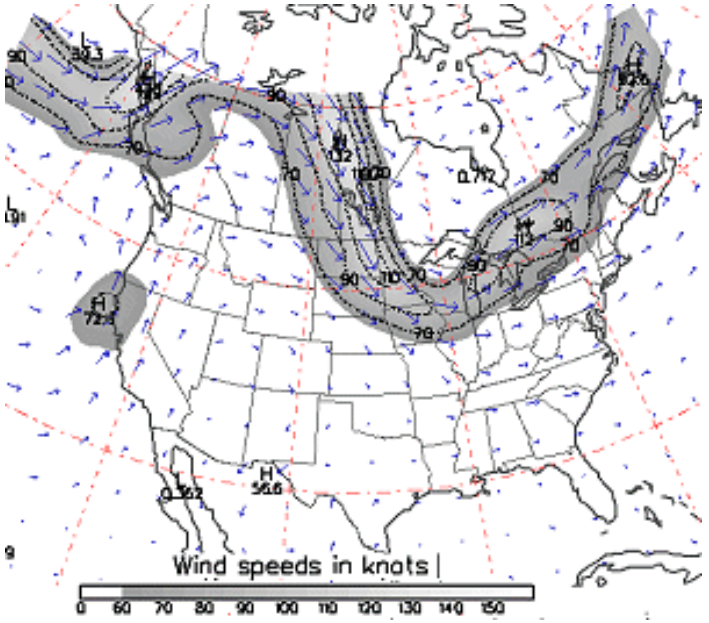
JPL


US/ North America
South America
Pacific Ocean
Thermocline
La Niña Conditions
COLD
WARM

El Nino & La Nina often reposition the atmospheric jet stream into recognizable patterns





http://science.nasa.gov/media/medialibrary/2000/09/16/ast15sep_1_resources/jetstream.gif

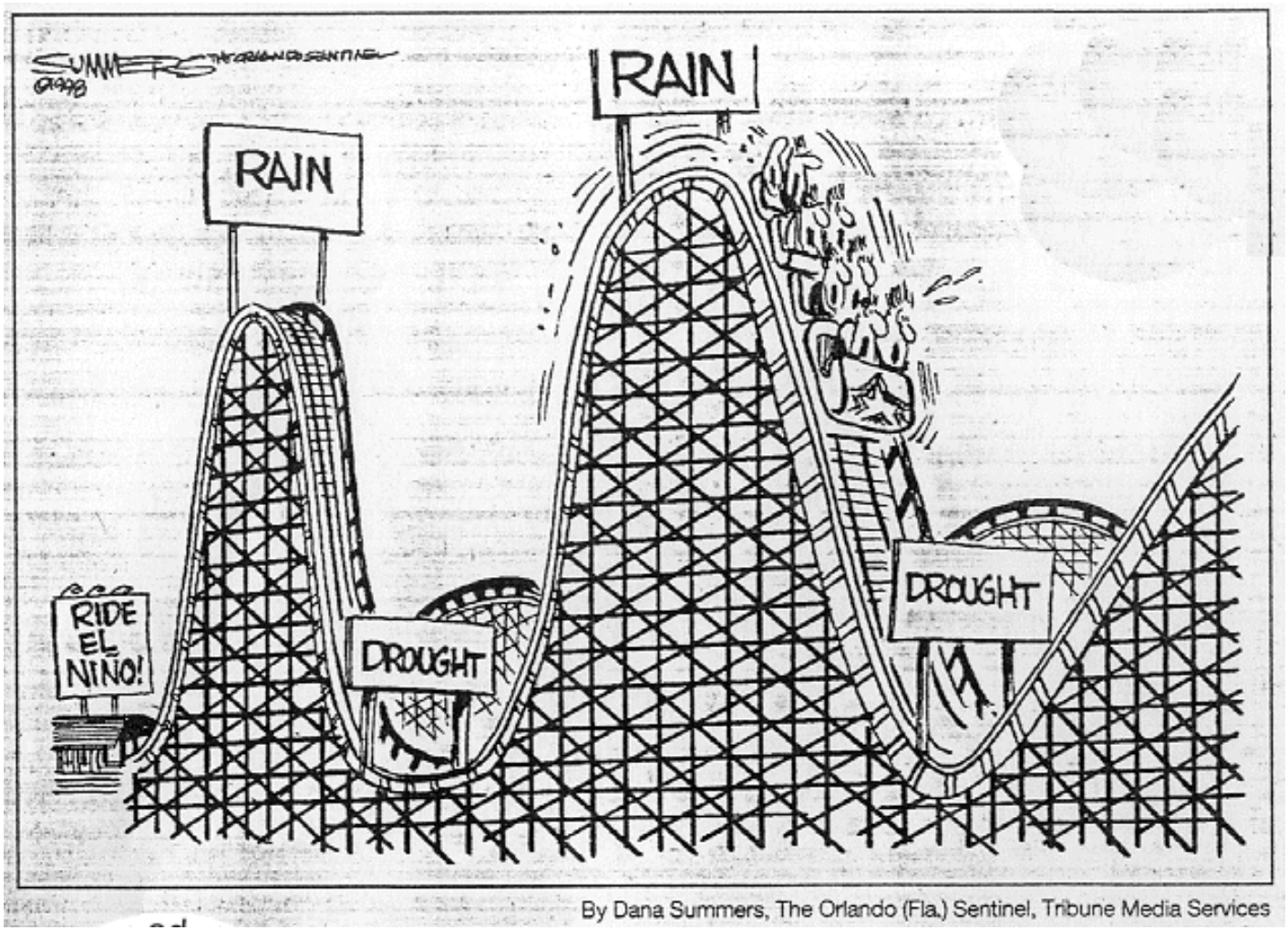
Jet Stream – region of high winds typically around 30,000 ft

Effects of El Nino/ La Nina on Indiana Temperatures

Month	El Nino	La Nina
Jan	Warmer	Warmer
Feb	Cooler	–
Mar	Cooler	cooler
Apr	–	–
May	–	–
Jun	Warmer	warmer
Jul	Cooler	warmer
Aug	Warmer	warmer
Sep	–	–
Oct	–	warmer
Nov	Warmer	–
Dec	cooler	–

Effects of El Nino / La Nina on Indiana Precipitation

Month	El Nino	La Nina
Jan	Drier	Drier
Feb	Wetter	Wetter
Mar	Wetter	Wetter
Apr	Drier	Drier
May	–	Drier
Jun	Drier	Drier
Jul	Wetter	Drier
Aug	–	–
Sep	–	Drier
Oct	–	Drier
Nov	Wetter	
Dec	drier	Drier



By Dana Summers, The Orlando (Fla.) Sentinel, Tribune Media Services

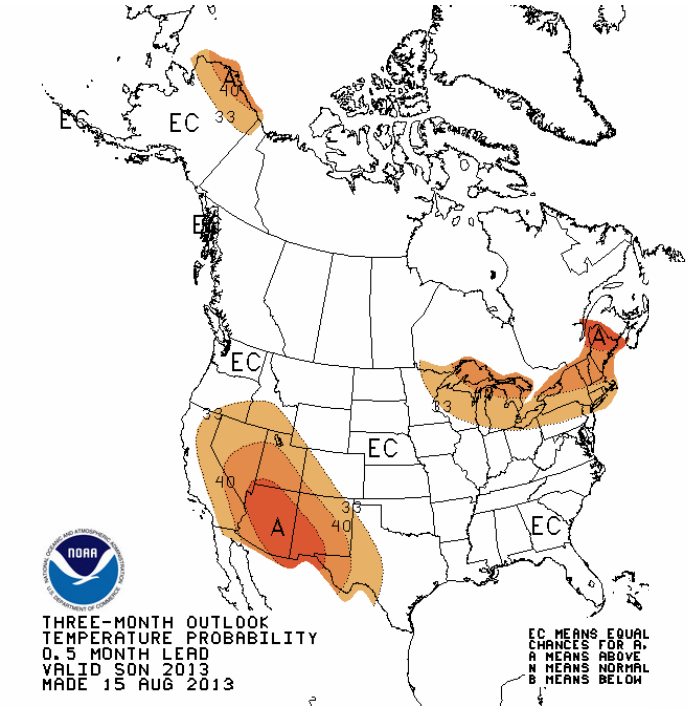
Arctic Oscillations also matter

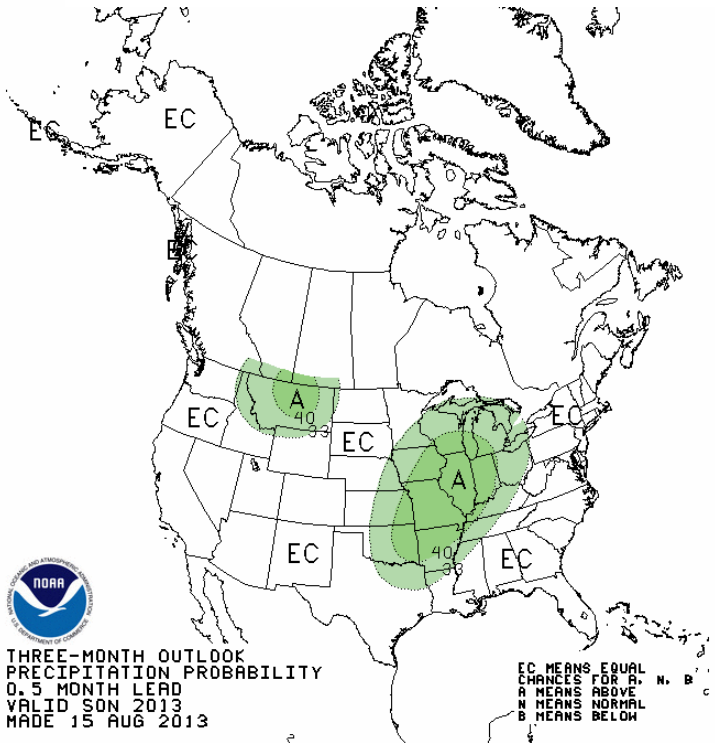
- 2012 at this time was warmer and drier than normal.
- 2013 so far is cooler and wetter than normal.
- The difference? The El Nino Southern Oscillation (ENSO) and the Arctic Oscillation
  - La Nina winter/springs (2012) are typically driest of the three ENSO phases (El Nino, neutral, or La Nina) and warmer than normal.
  - Neutral winter/springs (2013) are typically normal to wetter than the other two ENSO phases and coldest of the ENSO phases.
- Arctic Oscillation: 2013 has been in a negative phase, making the Midwest susceptible to cold air out breaks/colder than normal temperatures. 2012 we were in more of a neutral to positive phase, helping to moderate temperatures.

Seasonal Outlooks – August, September, October 2013

For the 3-month period:

- Equal chances to have above or below normal temperatures.
- 40% probability of higher than normal precipitation.

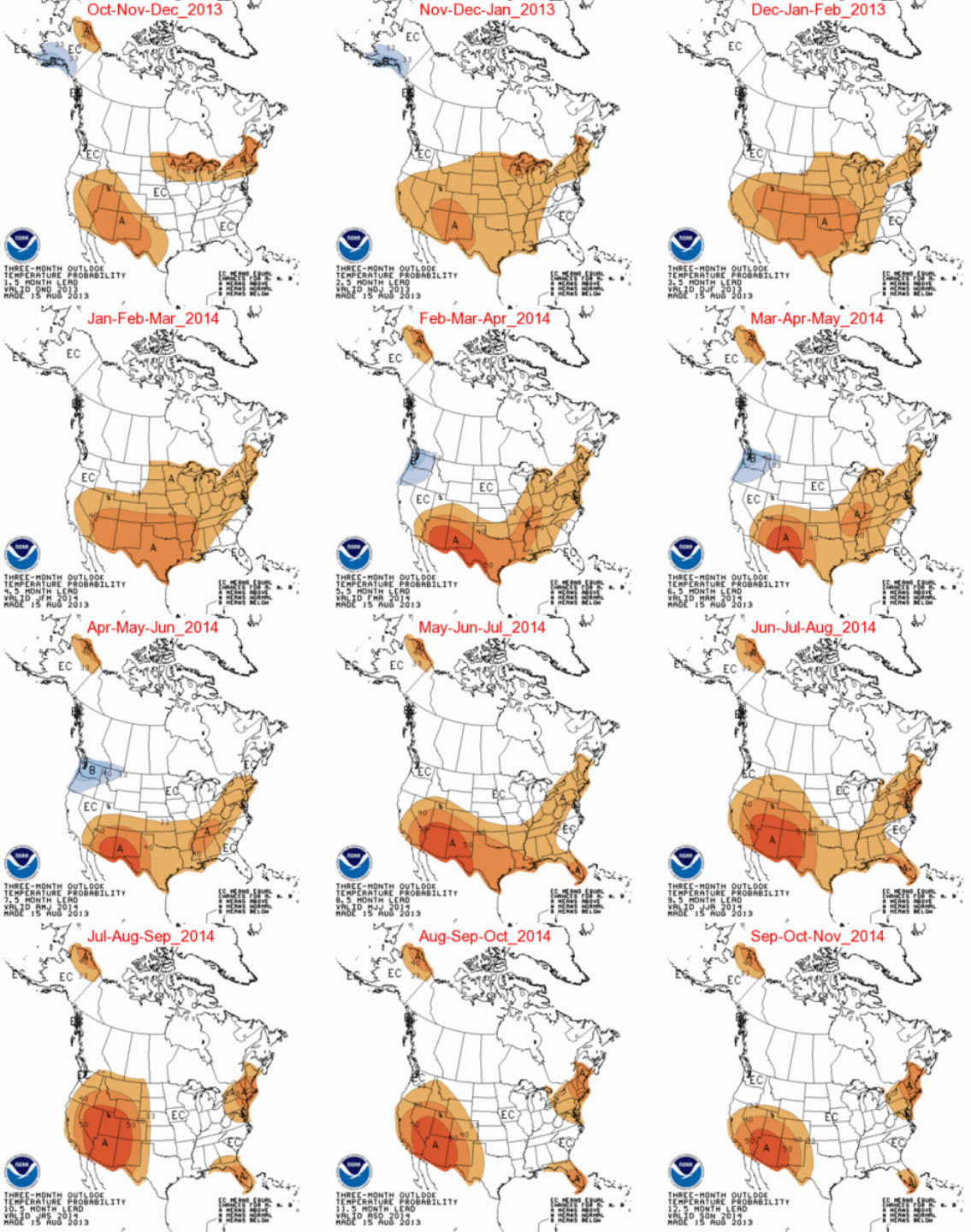




Seasonal outlooks , observations, and models all suggest:

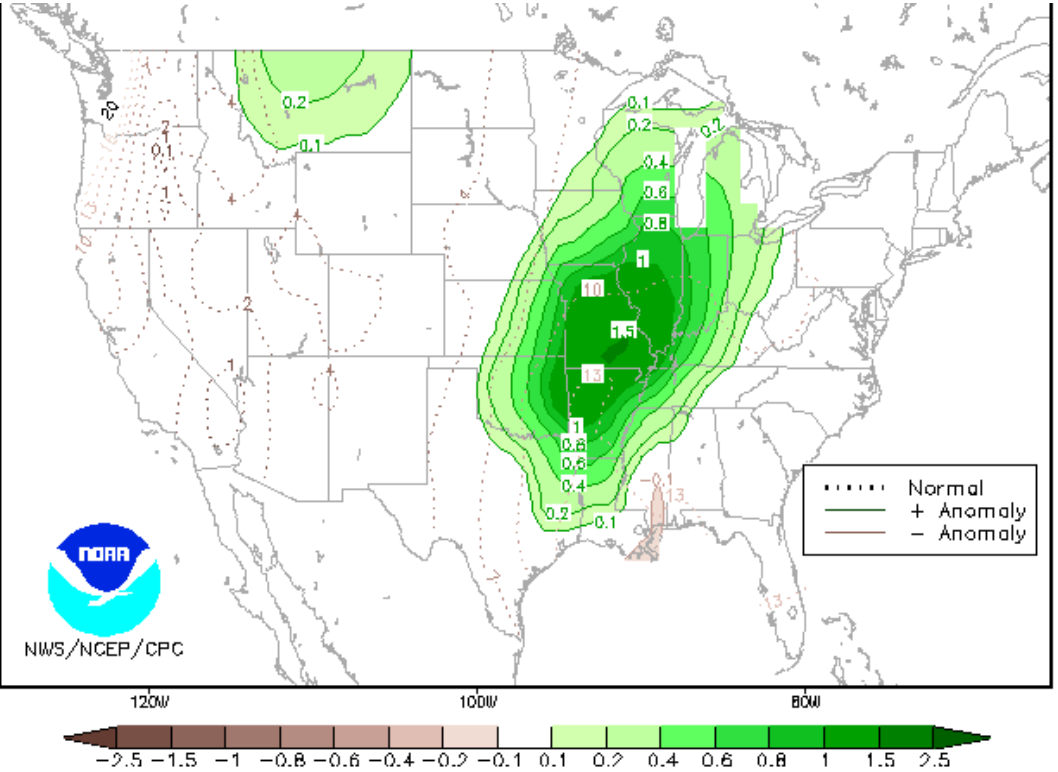
- Seasonal outlooks:
  - Shifting to a wetter trend
  - Temperatures near normal values
- El Nino prediction models are consistently pointing to neutral conditions for the northern hemisphere Fall 2013
  - Wetter conditions across IN
  - Average temperatures across IN expected to be near normal
    - ENSO neutral = greater possibility of several days of warmer than normal high temperatures in August
    - ENSO neutral = greater possibility for days with minimum temperatures dipping below 32 F in October.

Temperature Outlook

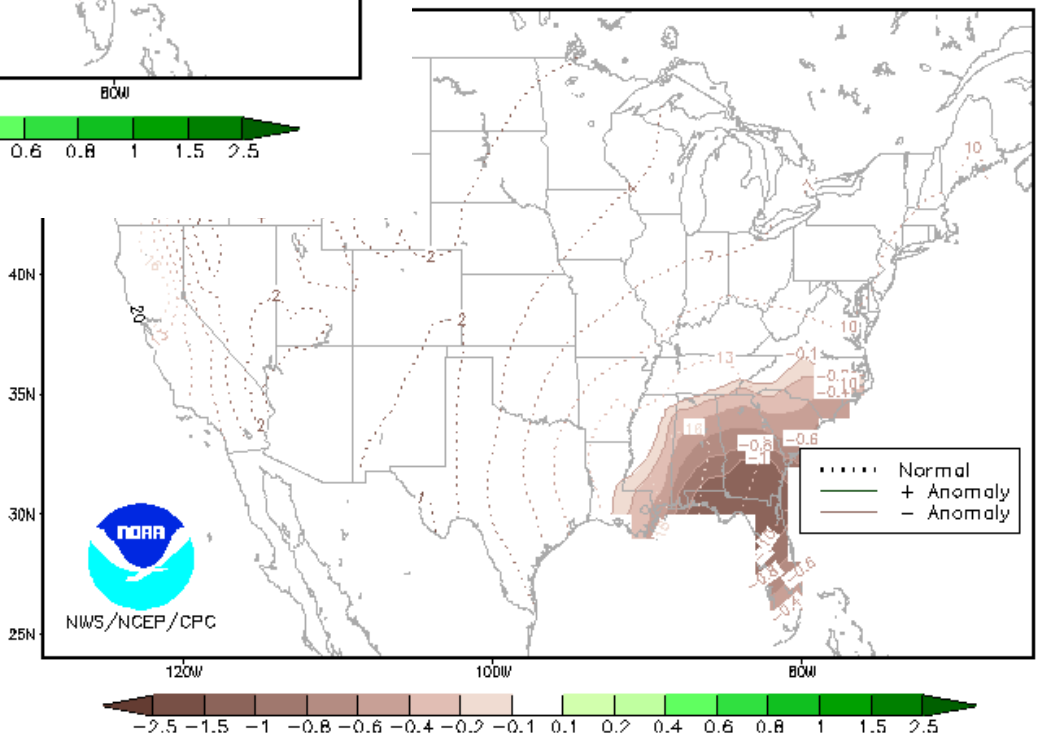


Oct- Nov-Dec

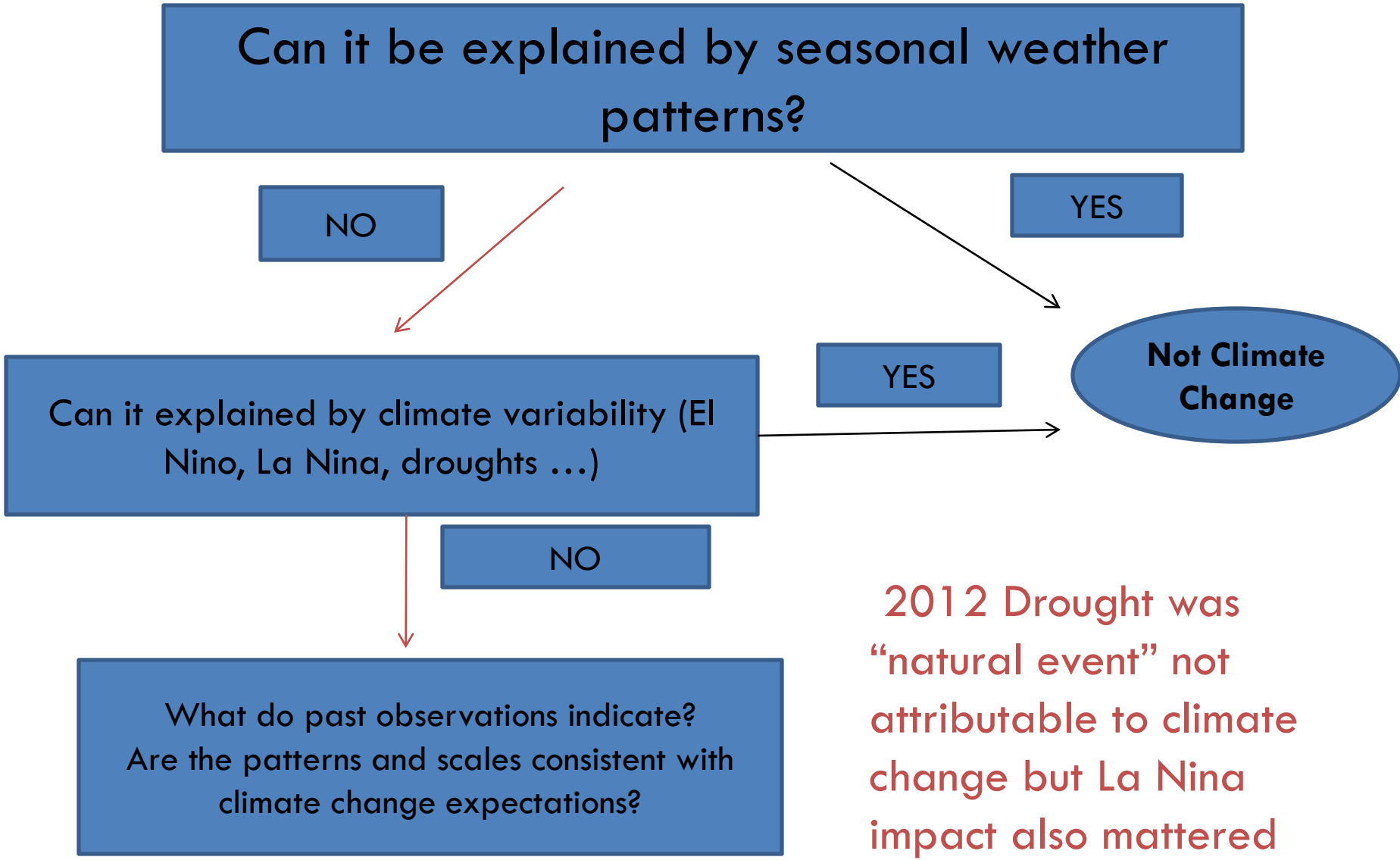
Precipitation Outlook



Jan – Feb- Mar 14



Water Stress/ Excess can be due to anomalous weather



2012 Drought was "natural event" not attributable to climate change but La Nina impact also mattered

Looking into the future (next decade)

Can Indiana continue relying on rainfed systems alone? Probably not (e.g.likely see more ground water irrigation systems)

Can Indiana landscapes, particularly cities, be planned to help mitigate water resource short fall and possibly modify regional rainfall?

Can a coordinated system help develop resources to provide relief when drought threatens Indiana businesses and communities?

Current Drought Actions In Indiana

Table 1. Criteria to Identify Drought Conditions and Water Shortage Stages

Water Shortage Stages	1-Month Standardized Precipitation Index[1]	U.S. Drought Monitor[2] (Conditions)	Streamflow As Percentile Of Normal[3] (Average Streamflow)
Normal (White and Yellow)	+0.99 to -0.99	None to D0	Greater than or equal to 25
Watch (Tan)	-1.00 to -1.49	D1	10 to 24
Warning (Orange)	-1.50 to -1.99	D2	6 to 9
Emergency (Red)	-2.00 or less	D3 to D4	5 or less

[1]For the purposes of Indiana's Water Shortage Plan, a monthly SPI value is computed for each of the State's nine climatic regions. For more detail, see the Standardized Precipitation discussion.
[2]The data cutoff for Drought Monitor maps is Tuesday at 7 a.m. Eastern Standard Time. The maps,

Watch – voluntary 5% reduction (irrigation, lawn…)
Warning – 10 – 15% reduction (mostly voluntary, coordinated)
Emergency – at least 15% reduction (voluntary and enforced)

Coordination and Integration

- Drought Monitor coordination and input consolidated through different agencies and provided to and from the US Drought Monitor through the Indiana State Climate Office @ Purdue
- This resulted in realistic depiction of drought status updates
- Need a system in place to take it to next level to understand impacts, and for “coming out of drought” –
  - Monitoring/ modeling, high resolution products
  - statewide framework for feedback

What about cities?

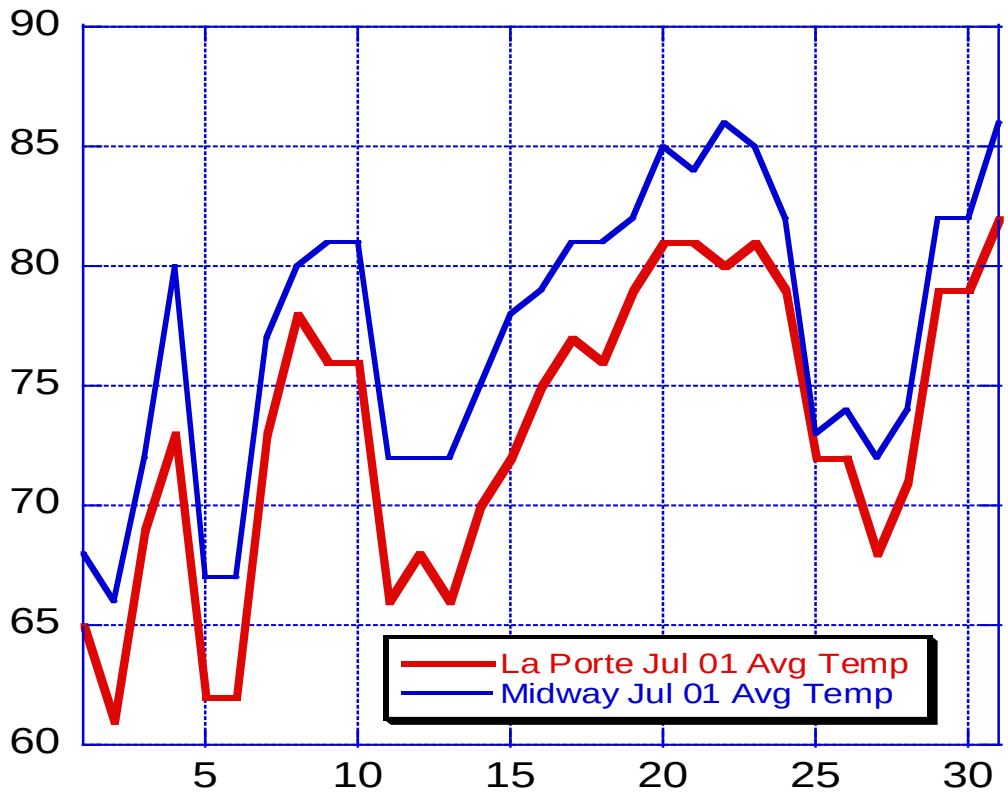
Droughts assessments and impacts have been and continue to mostly agricultural and to some extent forest focused

We need a completely new way of looking at looking at urban areas and droughts

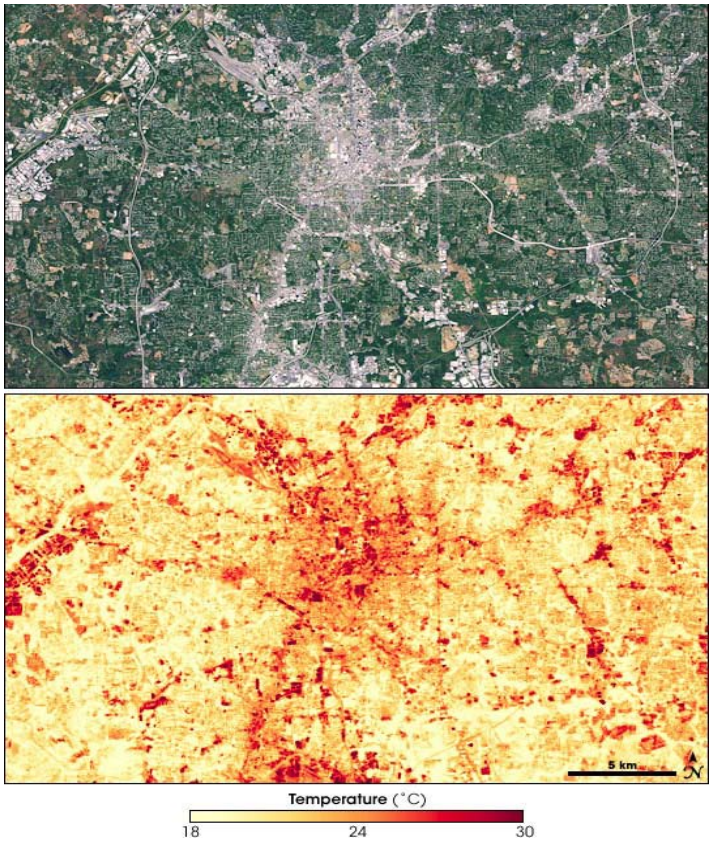
- cities can create their own storms
- city planning can help create / sustain water resource availability by altering temperature and rainfall (with or without climate change!)

Urbanization and landuse change leads to regional temperature changes (warming= Urban Heat Island)

Average Temperatures in
July for Urban & Rural Areas

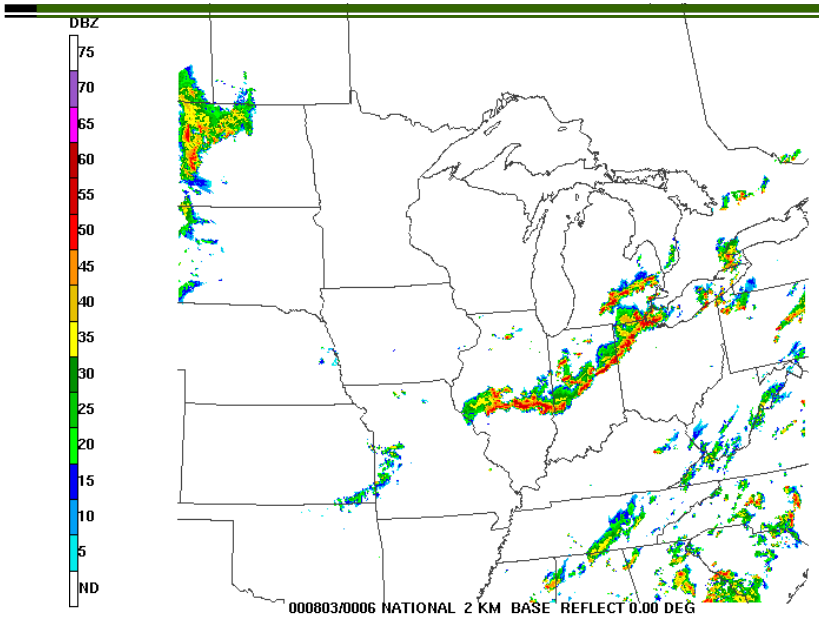


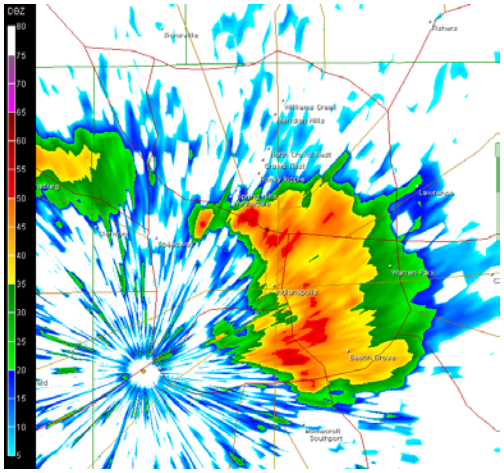
ATLANTA Urban Heat Island

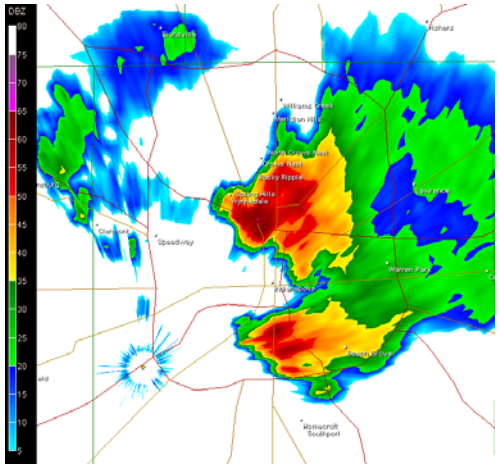


Urban landscape change also lead to rainfall changes!

Thunderstorms can be dangerous but they are also a major source of rainfall over Midwest.







So what do we know?

- Most studies, assessments, observations and projections support our available water resources are changing (how, how much, and why continues to be debated) -- STATIONARITY IS DEAD!
- Changing landscape/climate will alter regional weather and water availability ("bad" if you consider uncertainty.. "good" if you consider local actions matter)
- Impacts have a hammer and chisel effect – large scale processes provide the hammer, the local actions/ feedbacks can provide the chisel.
- The impact suggests, changes in regional practices can affect regional water resource sustainability

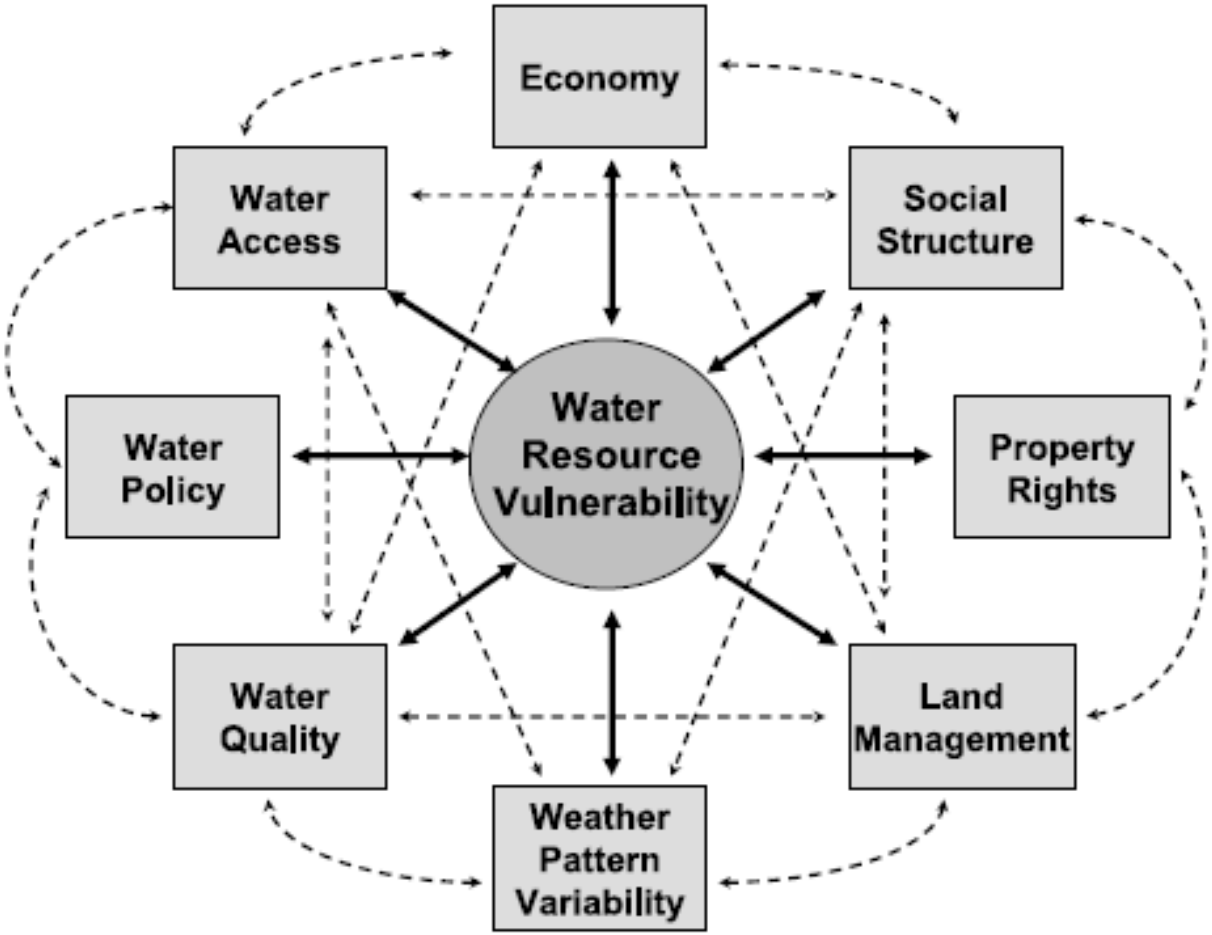
Additional features…we know/anticipate

- Heavy rains, extremes are highly likely.
- Expect extremes. Expect to be at the edge of the envelope
- Attribution more difficult i.e why this is happening.. But knowing changes underway can help plan.
- **Planning for variability (el nino/la nina like impacts) can help develop resilience for longer term change**

What to do? – Follow the water!

- Clarify the objective of what is the purpose (extreme analysis, risk assessment, variability change, need for accuracy…)
- Use literature review, observations and analysis products and multiple models to develop some assessments – simplify as possible.
- Models are often the only acceptable way of predicting the future - be cognizant of strengths and deficiencies of different approaches
- Uncertainty happens – but can be blended in the decision making.

Need for developing vulnerability analysis for Indiana



In conclusion

- Change is coming (already here) and happens!
- Shifts in “seasonal climatology”
- More extremes is the new normal
- Higher Variability -→ Change?
- Expect to have higher risks/ vulnerability
- Need to have adaptive, mitigative strategies in place for increasing resilience.
- Use smart city /landuse planning as an “ace” to mitigate possible rainfall changes - if used wisely with good decision making can be a new tool for water resource management in Indiana.

Exhibit 4
Water Resources Study Committee, Meeting #1
August 19, 2013

August 19, 2013 WRSC testimony

Thank you Mr. Chairman and members of the Water Resources Study Committee for the opportunity to present to you our perspective on this very important issue. I am Vince Griffin, Vice President of environmental and energy policy for the Indiana Chamber.

Wouldn't it be nice if every time you got in your car, you had a full tank of gas? You wouldn't have to worry about where you were going to fill up next or how much it was going to cost. Unfortunately, this is how most Hoosiers view the state's water supply.

Right now Hoosiers are using water with little to no regard for where it will come from in the future. Most people take for granted everyday things such as how they are able to have water available every time they turn on the faucet. As the most manufacturing-intensive state in the country, Indiana uses vast amounts of water each day to keep its economic engine operating. The aquifers and rivers also support agricultural production in Indiana that contributes almost $38 billion to the state's economy.

This abundant resource may become unreliable if we do not take the proper steps now. Indiana, along with many other states east of the Mississippi River, currently doesn't have a plan that secures its long-term water supply.

A clear and concise strategy is required for getting water to Hoosiers who will need it most. In order to do this, three basic questions must be answered:

1. Where is the water?
2. Who needs the water?
3. How do we get the water to where it is needed at the right time?

Central and southern Indiana have fewer aquifers than the northern half of the state. Without some policy that promotes regional distribution systems, development could be geographically constrained. Regional supplies would alleviate those concerns.

The Ohio River could serve as one resource. Twelve billion gallons of water flow through several Indiana cities and towns that sit on the river. At several points along the Ohio, there are ranney wells built during World War II to collect water from the river. But they have not been used in recent years. By adding pumps to these wells and building a system to distribute the water farther north, future shortages could be addressed.

Other options also would be available. All would be focused on moving the water to where it is needed. Doing so will help stabilize the economic performance of southern Indiana.

Lessons can be learned from Texas. Despite experiencing a tremendous population growth, it has poor water sources. In order to combat this problem, the state is divided into water regions. The supplies being used by each are closely tracked and, depending on consumption,

water moved to the regions that need it most. This system allows for continued economic growth as potential shortages are addressed.

Senate Enrolled Act 132 in 2012, which enables the state to gather information from water utilities, will help policymakers make informed decisions. The data also will help the utilities make smart choices when it comes to distributing their resources. Utilities submitted their surveys earlier this year, and the combined findings will be reported in September.

By being proactive, Indiana can become an example for others to follow. Early commitment is also critical as projects to distribute water supplies, while tremendously beneficial, will be costly.

In a recent speech, Dr. Jack Wittman, a national water expert based in Bloomington, summed up the importance of creating a water plan: "The first state, east of the Mississippi, to come up with a plan is the winner."

Governor Pence's "Roadmap" states that "we know that we need to better manage our water resources to ensure that Hoosiers have a sufficient quantity of water for business, industry, re-creation, and life."

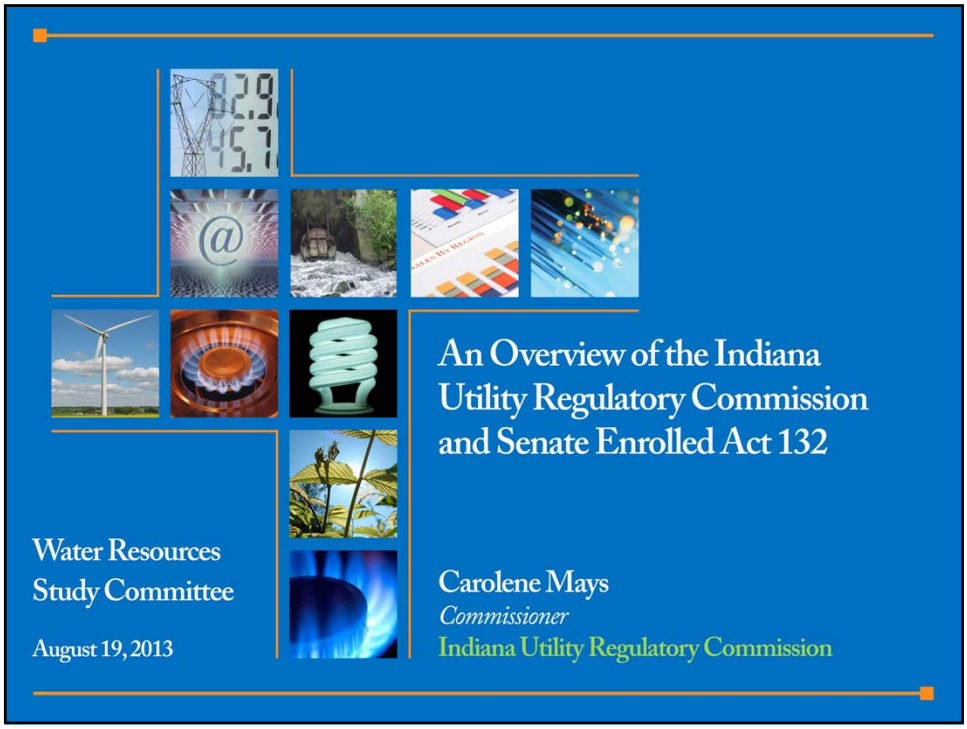
Consistent with that thinking, last November, the Indiana Chamber adopted our Vision 2025 that promotes the development of a plan. The basic elements of that plan include:

- Survey available water resources.
- Identify the areas of the state that have or will have significant water needs.
- Identify those local, regional or statewide approaches to water resources and requirements that would best maximize the value and minimize the cost of water use.
- Develop infrastructure investment priorities.
- Identify constitutional, statutory, administrative, or other policy changes necessary to create an effective system that will maximize water resources.
- Develop and implement a comprehensive, long-range plan considering both water and waste water needs that will realize a secure and advantageous position for the state's citizens, businesses and industries while promoting aggressive economic development.

The Indiana Chamber Foundation will consider the water plan study next month. If approved, the study is to be completed within six months.

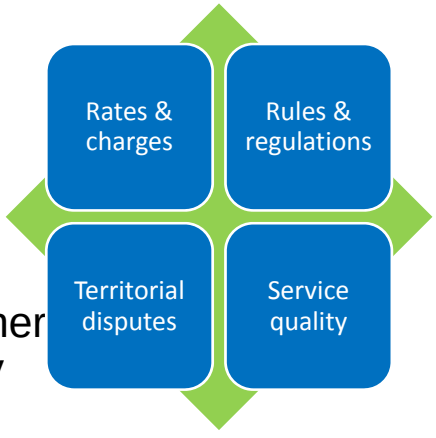
In closing, you may be disappointed if I did not cite Mark Twain's famous quote upon returning from California that "whiskey's for drinking and water's for fighting". In Indiana we are planners, not fighters. While there are future challenges, now is a time of opportunity. Unlike many areas of the country, Indiana has water resources. We can invent our water future by taking charge and planning for the future.

Exhibit 5
Water Resources Study Committee, Meeting #1
August 19, 2013



Overview

- Administrative utility court
- Economic regulator
- Regulated utilities
  - 92 of the 555 water utilities
  - 44 of the 547 wastewater utilities
- Coordination with other state agencies is key



Jurisdiction

Jurisdictional and Withdrawn Water and Wastewater Utilities

Type of Utility	Number of Jurisdictional Utilities	Number of Withdrawn Utilities
Municipal Water	31	363
Not-For-Profit Water	33	58
Investor-Owned Water	7	1
Conservancy District Water	6	1
Not-For-Profit Wastewater	6	12
Investor-Owned Wastewater	23	9
Not-For-Profit Water/Wastewater	2	4
Investor-Owned Water/Wastewater	13	2

Commission Jurisdicion Based on Utility Type

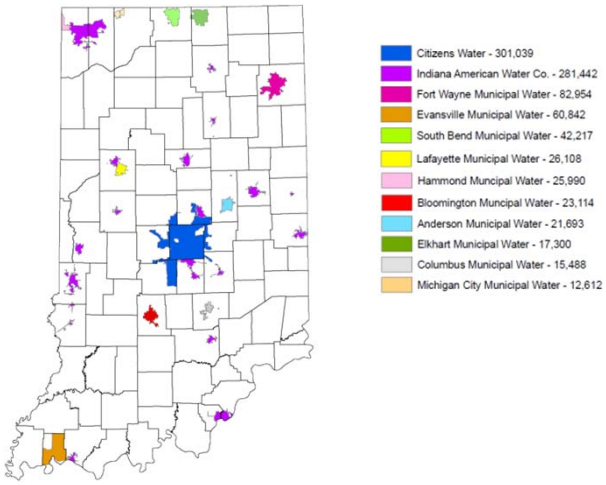
Type of Utility	Rates and Charges	Rules and Regulations	Ability to Withdraw from Jurisdiction	No Jurisdiction	CTA
Investor-Owned Water*	✓	✓	✓		
Investor-Owned Wastewater*	✓	✓	✓		✓
Not-for-Profit Water	✓	✓	✓		
Not-for-Profit Wastewater	✓	✓	✓		✓
Municipal Water	✓		✓		
Municipal Wastewater				✓	
Regional Water District				✓	
Regional Sewer District**				✓	
Conservancy Water District***	✓		✓		
Conservancy Sewer District				✓	

*Investor-owned water and sewer utilities with 300 customers or less can opt out of the IURC's jurisdiction, per IC § 8-1-2.7-1.3.

**Campgrounds served by regional sewer districts have the ability to appeal to the Commission's Consumer Affairs Division for an informal review of a disputed matter, per IC §13-26-11-2.1.

***IURC has jurisdiction over conservancy districts that make an election to provide water service under I.C. § 14-33-20 in its District Plan. Water conservancy districts with fewer than 2,000 customers can opt out of the IURC's jurisdiction, per IC § 8-1-2.7-1.3.

Regulatory Oversight



2011 Water Resources Study Committee

"While Indiana has been doing research and mapping of water resources, the institutional infrastructure that regulates and manages water resources may not be prepared to manage the serious economic effects of regional shortage."

Committee Findings

Recommendations:

1. Need an inventory of Indiana's water resources
2. Identify the areas in Indiana that will need water soon
3. Assess where water resources exist and compare to where resources are needed (How can the needs best be satisfied?)
4. Develop industry infrastructure priorities
5. Develop alternatives to reform and restructure how water is used and regulated paying attention to the value of a regional approach
6. Draft necessary legislation, rules, and best practices
7. **Develop a comprehensive plan of water and wastewater needs**

Intent of SEA 132

- Senate Enrolled Act (SEA) 132 was the first step
  - The purpose was to gather necessary data in a single place to enable policymakers to make informed decisions
- The bill does not re-regulate or place withdrawn utilities back under the IURC's jurisdiction
  - Instead, it provides a means to aggregate information about water resources within the state

Data Points

- For each calendar year, SEA 132 requires all water utilities, even those not regulated by the IURC, to provide information about the following:
  - Water resources used;
  - Operational and maintenance costs;
  - Utility plant in service;
  - Number of customers;
  - Service territory; and
  - The amount and types of funding received.

Project Timeline

- **February 2012** – IURC project team created
- **July 2012** – Effective date of the law
- **Summer 2012** – Extensive outreach to industry groups, utilities, cities and towns
- **December 2012** – Formal request for information
- **March 2013** – Electronic filing deadline
- **Summer 2013** – Follow up concludes, formal analysis begins

Response Rate

555 water utilities

↓

487 responses

↓

374 deemed complete

- All large utilities participated
- All jurisdiction utilities, except one, participated
- The majority of utilities not participating were smaller in size

General Findings

1. Very little research has been conducted on the nexus between water and economic development.
2. Better coordination is needed at the state level.
3. Strategic planning is lacking for many medium and small utilities.

Now What?

1. • Data gathering
   • Resource monitoring
2. • Cross-industry collaboration
   • State agency coordination
3. • Strategic planning
   • Problem solving

IURC to release formal recommendations at the Regulatory Flexibility Committee hearing on September 4th

Short Term & Long Term strategies are needed

Questions?

Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment Since 1986
A State that Works

Water Resources Study Committee
IDEM Water Supply Authority
August 19, 2013

Thomas W. Easterly, P.E., BCEE, Commissioner
Indiana Department of Environmental Management

1

Indiana Department of Environmental Management
Protecting Hoosiers and Our Environment Since 1986
A State that Works

IDEM's Mission

Protecting Hoosiers and Our Environment While Becoming the Most Customer-Friendly Environmental Agency

IDEM's mission is to implement federal and state regulations to protect human health and the environment while allowing the environmentally sound operations of industrial, agricultural, commercial and government activities vital to a prosperous economy.

2

Regulatory Purview

- Water quality traditionally is guided by Federal (Clean Water Act, Safe Drinking Water Act) and State (Indiana Code) laws.
- Water quantity traditionally is the domain of the states.

3

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Water Quantity and Quality: Inseparable

- Although water quality and quantity have separate regulatory frameworks, they are inseparable.
- Water can be plentiful in supply, but if it is not clean, it will be difficult to use for:
  - Public consumption
  - Industrial processes
  - Recreation

4

IDEM Water Responsibilities

IDEM's regulatory responsibilities generally focus on water quality, not water quantity.

- IDEM implements the Clean Water Act which protects the quality of surface waters and preserves wetlands.
- IDEM implements the Safe Drinking Water Act to ensure that drinking water systems provide clean and safe water to all Hoosiers.

5

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Public Water Systems

- IDEM's Drinking Water Program is primarily focused on the quality of water provided by public water supplies.
- IDEM also requires public water systems to have adequate supplies to meet their customers' needs.

6

Public Water Supplies

- About 5.5 million people in Indiana receive their drinking water from 4,150 public water systems.
- The remaining approximately 1 million people have private supplies, mainly individual wells using groundwater.
- These individual private wells are not regulated by IDEM.

7

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Types of Public Water Systems

- There are 801 Community Public Water Systems used by year-round residents. Examples: cities, towns, mobile home parks, homeowner associations.
- There are 677 Nontransient Noncommunity Public Water Systems which regularly serve the same 25 or more nonresident individuals. Examples: industries, businesses, schools, daycares, etc., with their own wells.

8

Types of Public Water Systems

- There are 2,782 Transient Public Water Systems which regularly serve at least 25 people (but not the same 25 people) for over six months/year. Examples include churches, restaurants, hotels/motels, campgrounds, gas stations, golf courses, etc., with their own wells to supply water.

9

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IDEM Ensures That Public Drinking Water Is Safe By:

- Reviewing monitoring and compliance data.
- Performing Inspections.
- Implementing programs to protect drinking water sources like the Wellhead Protection Program.
- Providing assistance to systems to help them understand and meet regulatory requirements.

10

IDEM Ensures That Public Drinking Water Is Safe By:

- Making sure the public is notified if there is a problem with their water.
- Making certain public water systems correct deficiencies.
- Approving infrastructure to make sure it is safe and reliable.
- Working with Homeland Security to protect critical infrastructure.

11

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In the Case of Inadequate Quality

- IDEM will work with system to ensure the public is aware of the problem and any steps they need to take to protect their health.
- In the short-term, IDEM will help the system find an alternative source of drinking water such as bottled water, hauled water or connection with another system.
- IDEM will work to ensure the system installs treatment or finds a new source of water.

12

In the Case of Inadequate Quantity

- IDEM works with the system to determine the reason(s) the supply is not adequate such as failing infrastructure, leakage, increased demand, etc.
- IDEM works with the system to try to find a solution to the supply problem.
- IDEM has regulatory tools like connection bans and enforcement that can be used if necessary to require improvements.

13

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IDEM Programs Impact Water Quantity

IDEM is primarily responsible for maintaining water quality, not water quantity.

- Sewers that protect water quality often result in groundwater from wells being discharged to surface waters—this decreases stored groundwater and increases surface water flows.
- Conversely, providing public water from a surface water supply to a community with septic tanks reduces surface water quantity while increasing groundwater supplies.

14

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IDEM Programs Impact Water Quantity

- Some wastewater regulations inadvertently address quantity issues:
  - Cooling water intake structure regulations (316b)
    - Restrict the speed of the intake of water to ensure that fish are not trapped in intake pipes.
    - May impact water withdrawal capacity.
  - Temperature for Water Discharges (316a)
    - Regulate wastewater discharge temperatures to protect diverse fish populations.
    - Temperature limits may lead to increased evaporative losses from closed loop cooling systems, reducing discharges.

15

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Questions?

Tom Easterly
Commissioner
Indiana Department of Environmental Management
(317) 232-8611

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16

Exhibit 7
Water Resources Study Committee, Meeting #1
August 19, 2013

Update on Water Resource Availability and Management Programs in Indiana

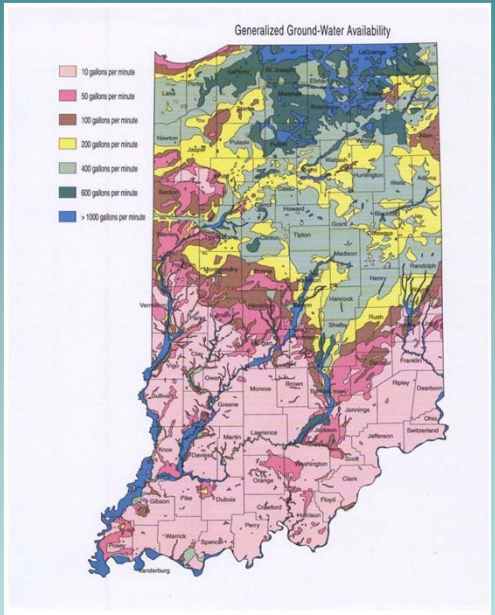
INDIANA DEPARTMENT OF NATURAL RESOURCES

Indiana Department of Natural Resources
Division of Water

The Division of Water studies and maintains information on surface and ground water availability:

- USGS Gaging Network: 165 Stream Gages; 36 Monitoring Wells; 10 Lake Gages; 1 Reservoir Gage
- 6 Basin Studies completed during 1987 -2002
- County Bedrock/Unconsolidated Aquifer Systems Maps completed in 2011

Statewide Ground Water Availability
(1980 Governor's Study)



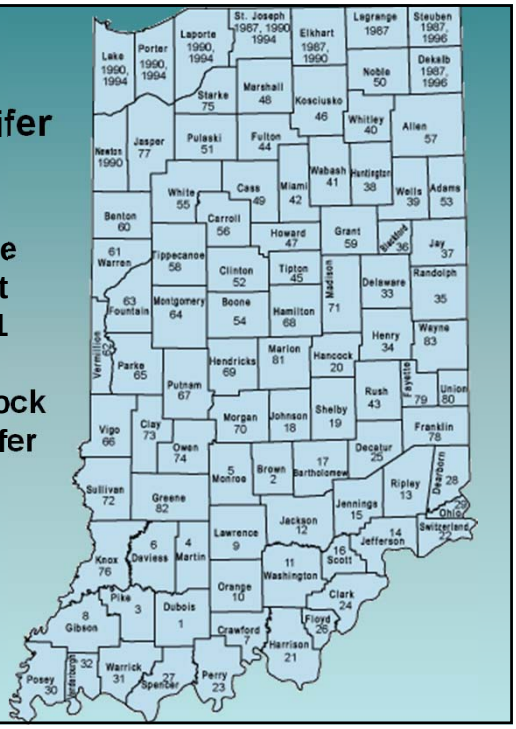
Water Resource Assessments
(Basin Studies)

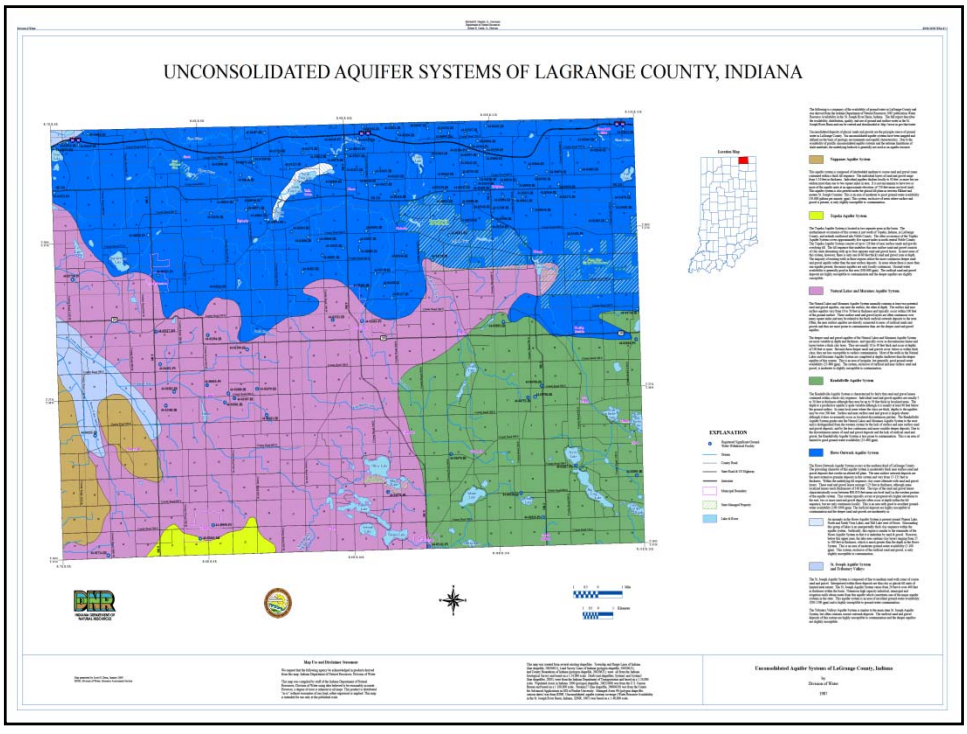
Six Completed 1987-2002

Division of Water Aquifer Systems Mapping

County-based statewide aquifer systems project completed August 2011

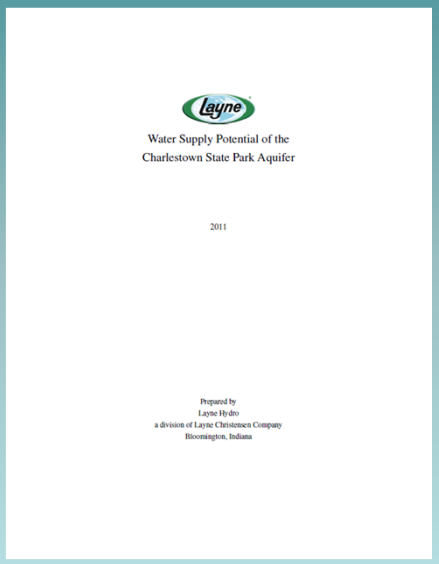
Maps completed for bedrock and unconsolidated aquifer systems





Ground Water Supply Potential of Charlestown State Park

- 2011 report of ground water supply potential completed in two phases:
  1) Field investigation
  2) Ground water flow model
- Estimated sustainable yield of approximately 75 MGD
- Recharge of aquifer by Ohio River provides protection against drought
- Current capacity of treatment plant is 2 MGD (can be increased to 4 MGD)


Water Supply Potential of the
Charlestown State Park Aquifer

2011

Prepared by
Layne Hydro
a division of Layne Christensen Company
Bloomington, Indiana

Indiana Code 14-25-7-15: Water Resource Management

- Every person who has a SWWF shall register it with the Natural Resources Commission
- All SWWF completed after July 1, 1984, must be registered within 3 months after installation
- The owner of the SWWF shall report water use within three months after the end of each calendar year on forms provided by the commission

Significant Water Withdrawal Facility (SWWF)

- The water withdrawal facilities of a person that, in the aggregate from all sources and by all methods, has the capability of withdrawing more than 100,000 gallons of ground water, surface water, or ground and surface water combined in one day.

Indiana Department of Natural Resources / Division of Water

Water Use System

Water Use Information For 2011

Registration : 76-02726-MI

Owner :
Indiana Department of Natural Resources
Division of Parks & Reservoirs
402 W. Washington St. W298
Indianapolis IN 46204
Phone: (317) 232-4124

Contact :
Pokagon State Park
Ted Bohman, Property Manager
450 Lane 100 Lake James
Angola IN 46703-9501
Phone: (260) 833-2012

Total Time of Pump Operation 365 Days Measurement Method:

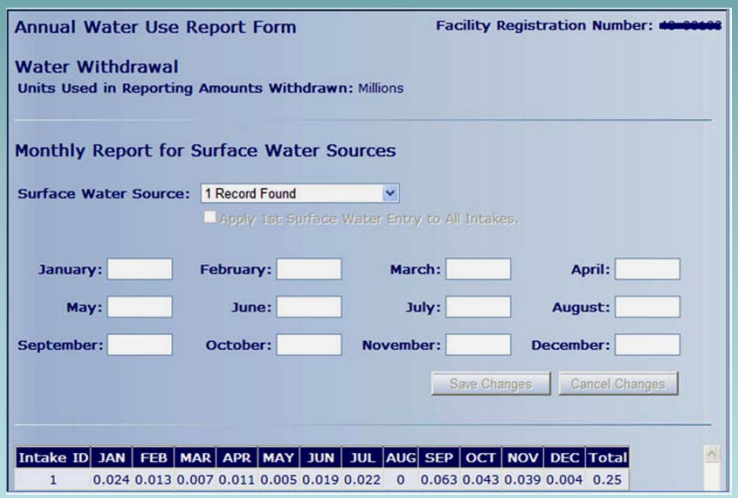
Ground Water Withdrawal Information In Millions Gallons

Number	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	.22	.20	.17	.18	.20	.53	.42	.30	.20	.24	.16	.26
2	.22	.20	.17	.18	.20	.53	.42	.30	.20	.24	.16	.26
3	.06	.09	.10	.04	.10	.17	.29	.18	.11	.09	.02	.02
4	.06	.09	.10	.04	.10	.17	.29	.18	.11	.09	.02	.02

Ground Water Source Information:

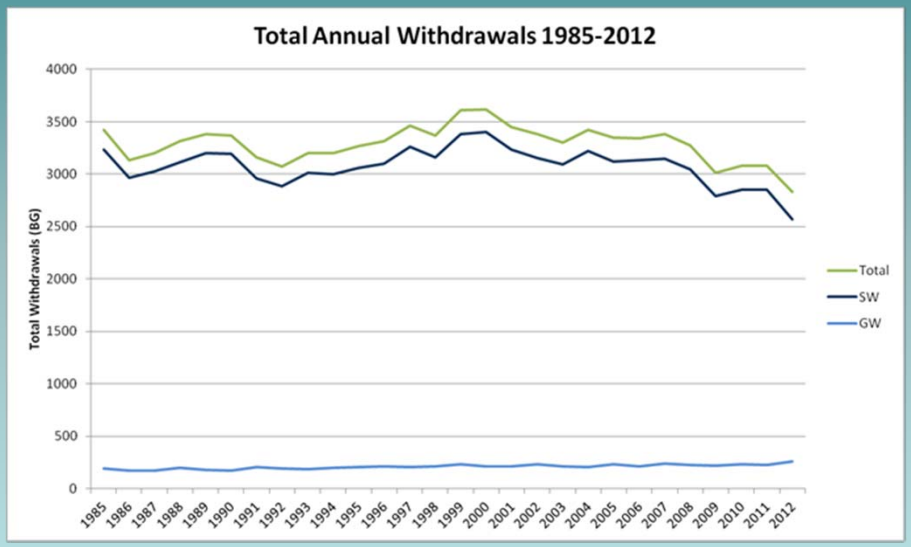
Number	Capacity, GPM	Depth, FT	Diameter, IN	Aquifer Utilized	UTMN	UTME
1	90	80	6	SG	4618675	664500
2	150	87	8	SG	4618675	664575
3	100	150	6	GR	4619675	663650
4	100	130	8	GR	4619420	663760

Online Submittal of Annual Water Use Data Available in 2012



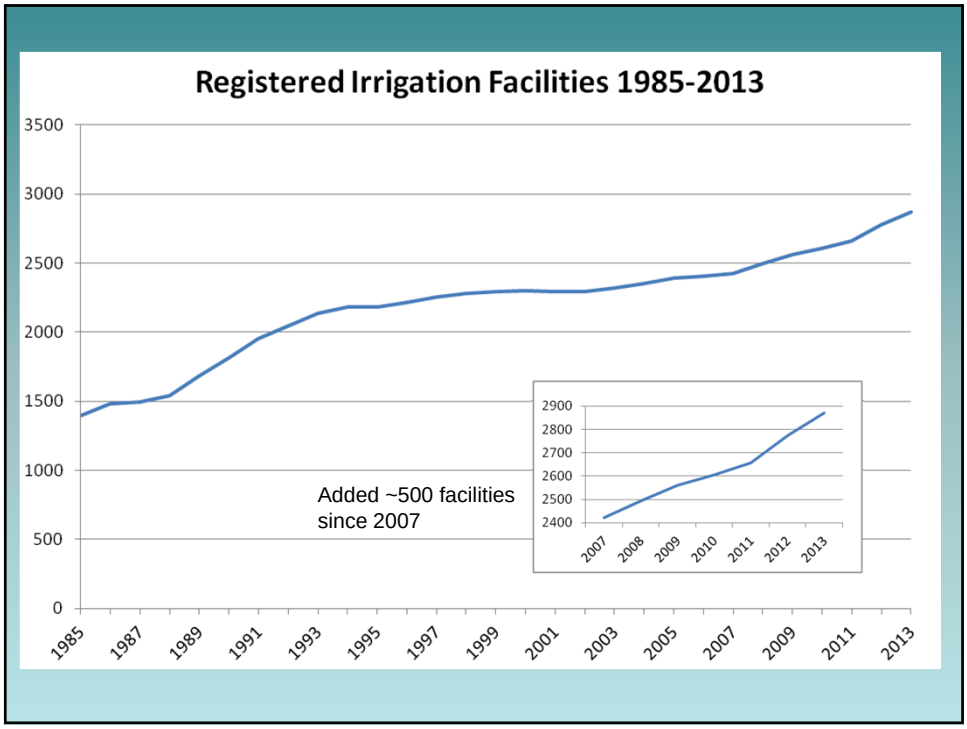
SWWF Water Use Reporting

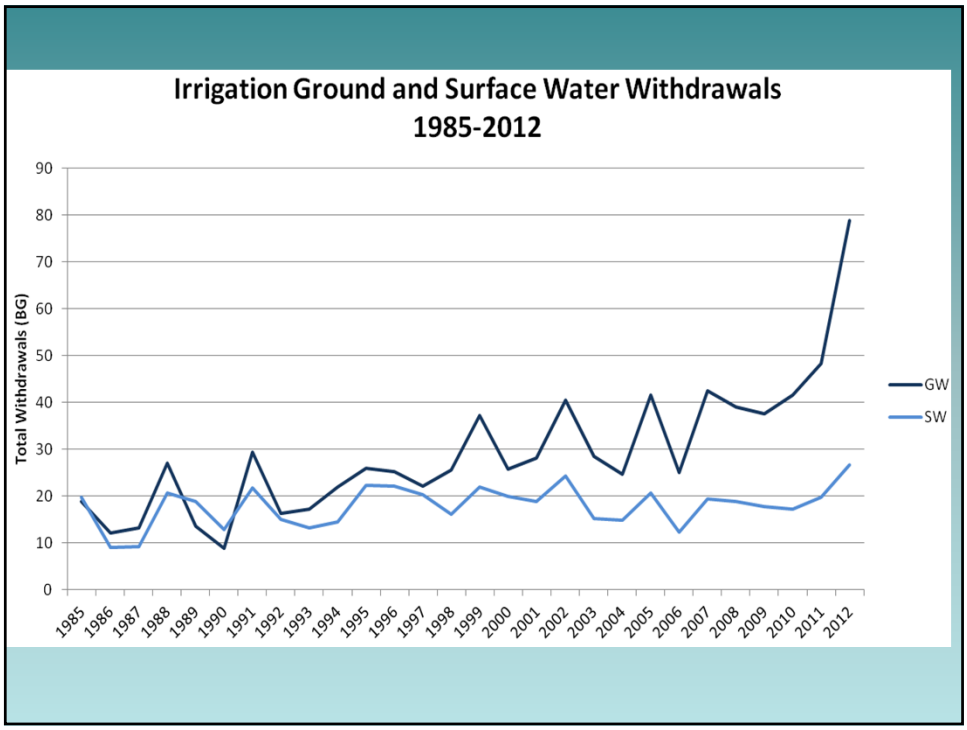
2012 STATE TOTALS				
	Withdrawals (BG)	*Capacity (MGD)*	*Withdrawals vs Capacity*	*Current Number*
Surface Intakes	2533	16471	42.1%	1378
Wells	259	5421	13.1%	6786
TOTAL	2792	21892	34.9%	8164
Facilities				3835



2013 Indiana Registered SWWFs

Water Use Code	Number of Facilities	Number of Wells	Number of Intakes
EP	97	246	111
IN	380	697	287
IR	2428	3232	843
MI	148	251	54
PS	719	2192	69
RU	63	168	14
TOTAL	3835	6786	1378


Registered Irrigation Facilities 1985-2013
3500
3000
2500
2000
1500
1000
500
0
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
Added ~500 facilities since 2007
2900
2800
2700
2600
2500
2400
2007
2008
2009
2010
2011
2012
2013


Irrigation Ground and Surface Water Withdrawals 1985-2012
Total Withdrawals (BG)
90
80
70
60
50
40
30
20
10
0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
GW
SW

Indiana Code 14-25-4: Water Rights: Emergency Regulation

Indiana Code 14-25-4

- Provides for “Timely and Reasonable Compensation” to owners of domestic wells affected by high capacity ground-water pumpage
- Provides for restrictions on high capacity ground-water pumpage under certain conditions

Timely and Reasonable Compensation

Timely and reasonable compensation consists of and is limited to the following:

1) The immediate temporary provision at the prior point of use of an adequate supply of potable water
2) Reimbursement of expenses reasonably incurred to obtain a temporary supply of water and/or provide timely and reasonable compensation as provided in (3)(A) and (3)(B).

(3) Either;

(A)The restoration of the affected well to its former relative capability;

(B) The permanent provision at the prior point of use of an alternative supply of potable water; or

(C) The permanent restriction or scheduling of the high capacity ground-water withdrawals so that the affected well continues to produce its normal supply of water.

Restriction of Ground-Water Withdrawals

The director may restrict the quantity of ground water that may be extracted from a significant ground-water withdrawal facility upon the declaration of a ground water emergency if:

(1) The facility is reasonably believed to have caused the failure of the complainant's water well; and

(2) The immediate temporary provision of and adequate supply of water is not carried out; or

(3) There is reasonable belief that continued ground-water withdrawals from the facility will exceed the recharge capability of the ground-water resource of the area.

2012 – 2013 Ground Water Rights Investigations under IC 14-25-4

- Approximately 150 investigations conducted during months of June and July, 2012
    1) Jasper Co. – AG Irrigation
    2) Hendricks Co. – GC Irrigation/PWS
    3) Putnam Co. – AG Irrigation
- Multiple well failures in Benton and Warren Counties during summer of 2013 due to new irrigation withdrawals.
- Impacts on domestic wells in Marion Co. during August of 2013 due to water withdrawals at new Cricket Facility.

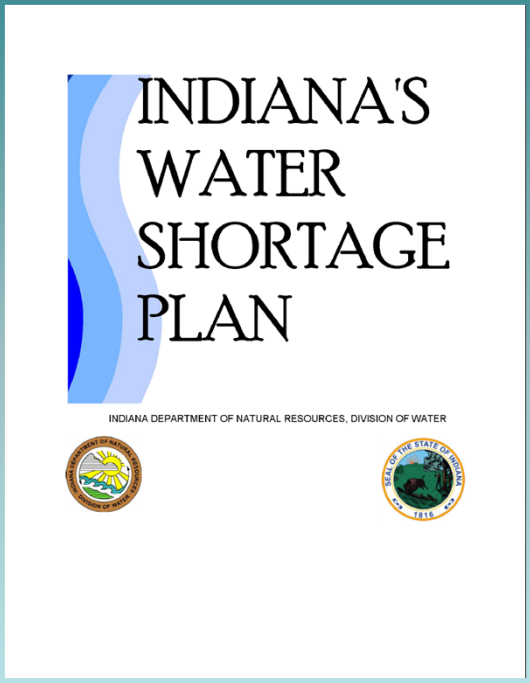
Indiana Code 14-25-5: Emergency Regulation of Surface Water Rights

- Provides protection for owners of freshwater lakes against impacts of significant water withdrawal facilities
- Significant lowering of lake level must be documented
- Water level lowering must result in *significant environmental harm*

Objectives of Water Shortage Plan:

1) Coordinated Response to Water Shortage conditions

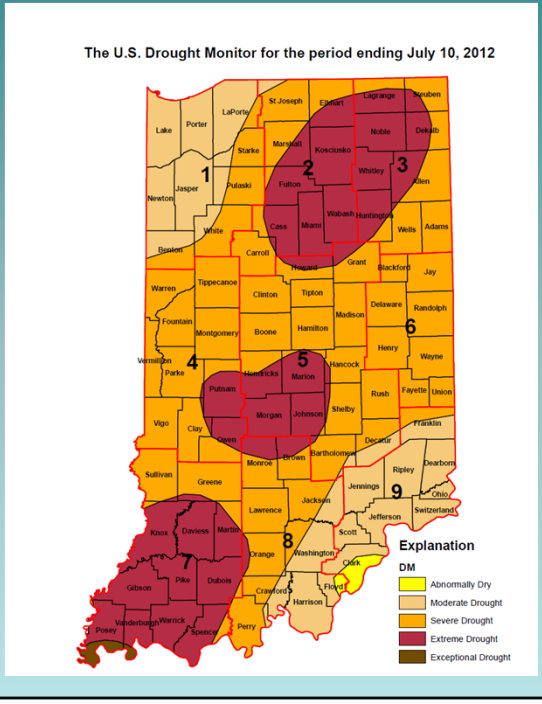
2) Voluntary Conservation to avoid or reduce shortages



Water Shortage Plan Advisory Phases and Recommended Conservation:

- *Watch Phase* - 5% voluntary conservation
- *Warning Phase* - 10 to 15% voluntary conservation
- *Emergency Phase* – >15% conservation (Governor Declaration under IC 10-14-3)

"Water Shortage Warning" **Issued on July 17th, 2012, for entire State under Criteria Established in *Indiana's Water Shortage Plan***



2012 Declaration of *"Water Shortage Warning"* sent to owners of 3650 SWWFs

DNR Indiana Department of Natural Resources

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director
Division of Water
402 W. Washington Street
Room W264
Indianapolis, IN 46204
Phone (317) 232-4160
Toll-free (877) 928-3755
Fax (317) 233-4579
www.in.gov/dnr/water/

July 17, 2012

To: Owners/Operators of Significant Water Withdrawal Facilities

The Indiana Department of Natural Resources and the Indiana Department of Homeland Security have issued a Water Shortage Warning because of drought conditions for all counties in the State of Indiana.

The objectives of the Water Shortage Warning stage are to prepare for a coordinated response to imminent water shortage conditions and potential water supply problems and to initiate concerted voluntary conservation measures in an effort to avoid or reduce shortages, relieve stressed sources, and if possible forestall the need for mandatory water use restrictions. A Water Shortage Watch is the lowest or mildest of three drought advisory phases; **a Water Shortage Warning is the second most severe stage;** and a Water Shortage Emergency is the most extreme condition. **Please be aware that a Water Shortage Warning was previously issued on July 2, 2012, for 32 counties in northeast and southwest Indiana.**

The goal of water conservation efforts during the Water Shortage Warning stage is a voluntary reduction in current water use of 10-15%. Public water supply systems are advised to immediately develop and update water shortage contingency plans for their respective systems, where such plans are not already available for implementation. Indiana's Water Shortage Plan, located on the Internet at http://www.in.gov/dnr/water/files/watshplan.pdf , lists several voluntary water conservation measures and programs for various categories of water users during a Water Shortage Warning, and can be found on pages 16 through 18. Indiana's Water Shortage Plan also includes an "Indiana Suggested Model Ordinance" that was developed by the Water Shortage Task Force to serve as a template for a Local Unit of Government to implement their own specific policies and response for water conservation and restriction within a community. A Word document version of the "Indiana Suggested Model Ordinance" can be found on the Internet at http://www.in.gov/dnr/3124.htm under the heading "Additional Links/Information" or directly at http://www.in.gov/dnr/water/files/Model_ordinance_Final_Draft%207-2-07.doc.

If you have any questions or would like additional information regarding the Department of Natural Resource's declaration of the Water Shortage Warning or Indiana's Water Shortage Plan, please contact Mark Basch by e-mail at mbasch@dnr.IN.gov or at (317) 232-0154 or Jerry Unterreiner at gunterreiner@dnr.in.gov or at (317) 232-4222.

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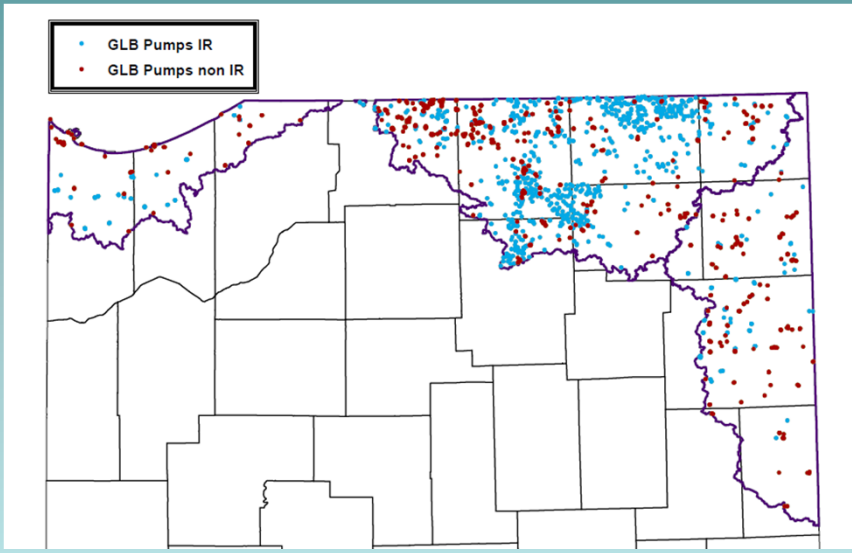
Indiana Code 14-25-15: Indiana's implementation of the Great Lakes_St. Lawrence River Basin Water Resources Compact

Locations of Registered Wells & Intakes within the Great Lakes Basin



Compact Purposes: Effective consistent water resource management

- Remove causes of present and future controversies;
- Provide for cooperative planning and action;
- Facilitate consistent water management approach;
- Facilitate data exchange and scientific information base for decision making;
- Prevent significant adverse impacts of water withdrawals and losses;
- Promote interstate and state-provincial comity; and
- Promote adaptive management approach to conservation and management of basin waters.

Real Purpose of Great Lakes Compact:

Section 4.8. *All new or increased diversions are prohibited except as provided for in the compact.*

Section 4.9. *Exceptions to the prohibition for straddling communities, straddling counties and intra-basin transfers.*

Indiana's Implementation of the Great Lakes Compact under IC 14-25-15

Permit Required for:

- *Withdrawals greater than 5 MGD (90 day ave.) from Lake Michigan*
- *Withdrawals greater than 1 MGD (90 day ave.) from other ground water or surface water source*
- *Withdrawals greater than 100,000 GPD from a Salmonid Stream*

Proposed Rule #12-089(W)

- *Amends 312 IAC 6.2 to assist with implementation of IC 14-25-15*
- *Proposed Rule Addresses:*

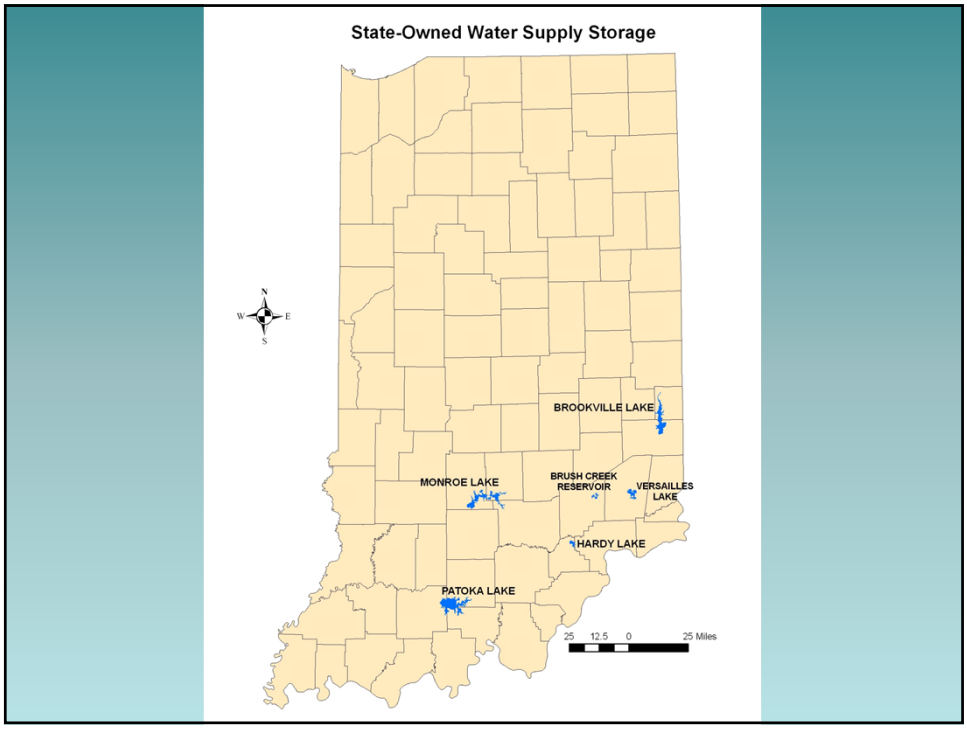
  1) registration and permitting of water withdrawals ;

  2) voluntary conservation and efficiency program; and

  3) mandatory conservation and efficiency programs for new and increased withdrawals, diversions and consumptive uses in Great Lakes Basin
- *Proposed Effective date of November 1, 2013; can be viewed at www.in.gov/nrc/2377.htm*
- *Temporary Rule #12-586(E) currently in place*

Indiana Code 14-25-2: Minimum Stream Flow and Sale of Water Contracts

- State of Indiana may sell water for water supply purposes from reservoir impoundments financed by the state.
- State of Indiana may contract for minimum stream flows or for the sale of water on a unit pricing basis for a period of no more than 50 years.
- After June 30, 1991, State of Indiana must be compensated at the rate of thirty-three dollars ($33) per one million (1,000,000) gallons of water.



Existing Water Supply Contracts: Dates, Terms, & Expirations

Lake	Client	Contract	Term (yrs)	Expires	Avg. Daily Limit	Annual Limit
					million gal.	million gal.
Brookville	Brook Hill GC	1/7/05	10	1/7/15	-----	25.00
Brookville	Brookville Enhancement Partners (GC)	7/2/2011	10	7/2/2021	-----	35.00
Hardy	Stucker Fork CD	2/17/97	40	12/31/38	no limit	no limit
Monroe	Bloomington	1/7/05	20	1/7/25	24.000	*8,760.00*
Monroe	Boy Scouts of Am.	5/15/90	25	8/31/15	0.200	20.00
Monroe	Eagle Pointe GC	3/17/2009	10	3/17/2019	-----	85.00
Monroe	IPALCO	7/21/2009	20	7/21/2029	-----	325.90
Monroe	Salt Creek Svcs.	2/9/68	50	2/9/18	0.025	*9.13*
Patoka	Patoka Lake Reg.	7/1/2009	50	6/30/2059	20.000	*7,300.00*

For more information regarding Indiana's:

Water Resource Availability
and
Water Management Programs

www.in.gov/dnr/water

Exhibit 8
Water Resources Study Committee, Meeting #1
August 19,2013

Indiana State Department of Health

Mike Mettler, REHS, Director
Environmental Public Health Division
317/233-7183
mmettler@isdh.in.gov

ISDH's Role with Water Quality

- ❑Onsite Sewage Systems Program
- ❑Water Fluoridation
- ❑Private Drinking Water Wells

1

Onsite Sewage Systems Program
a.k.a. septic systems

- 30% of the State's residences utilize
- Approximately 1,000,000 Residences & Businesses
- Code designed to properly treat wastewater "onsite" to protect groundwater sources
- 7,000 to 10,000 permits per year
- LHDs handle residential systems
- ISDH permits commercial systems.

Indiana State Department of Health

3

2

Water Fluoridation

- Public Health Program - CDC ranks it as one of the top 10 greatest public health achievements of the twentieth century
- Federally funded program
- CDC estimates that for every $1 spent on fluoridation, $38 is saved in reduced dental care
- 95% of the State's population using a public drinking water system are getting optimally fluoridated water

Indiana State Department of Health

4

Fluoridation Inspections

- ✓ Make sure the equipment is operating properly
- ✓ Determine the amount of fluoride compound used to treat the water
- ✓ Make sure the operator is testing and sampling as required
- ✓ Make sure safety equipment is in place
- ✓ If there is any problem we try to solve it ASAP and get the system operating optimally

Indiana State Department of Health

5

3

Private Drinking Water Wells

- 25% of the State's population served by private wells
- Wells that fall below IDEM's threshold, which is 15 connections or a population of 25 individuals.
- Provide testing information and outreach
- Provide lab testing services
- Provide technical assistance to Homeowners

Indiana State Department of Health

6

Mike Mettler, REHS, Director

Environmental Public Health Division

Indiana State Department of Health

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7