# UNCERTAINTIES AND CHALLENGES IN STATE AND REGIONAL WATER SUPPLY PLANNING

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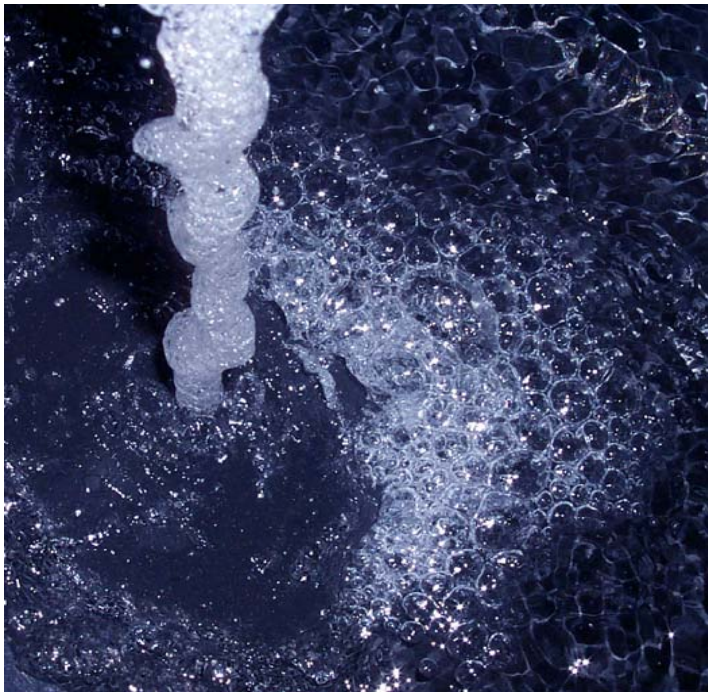


# CONTENT

- **Purpose of water supply planning**
- **Uncertain future and data and analytical limitations**
  - **drought and climate change**
  - **water withdrawals**
  - **geology**
  - **water demand**
  - **impacts of withdrawals**
  - **economics**
  - **social values**
- **Conclusions**

# THE GOAL
# OF
# WATER SUPPLY PLANNING

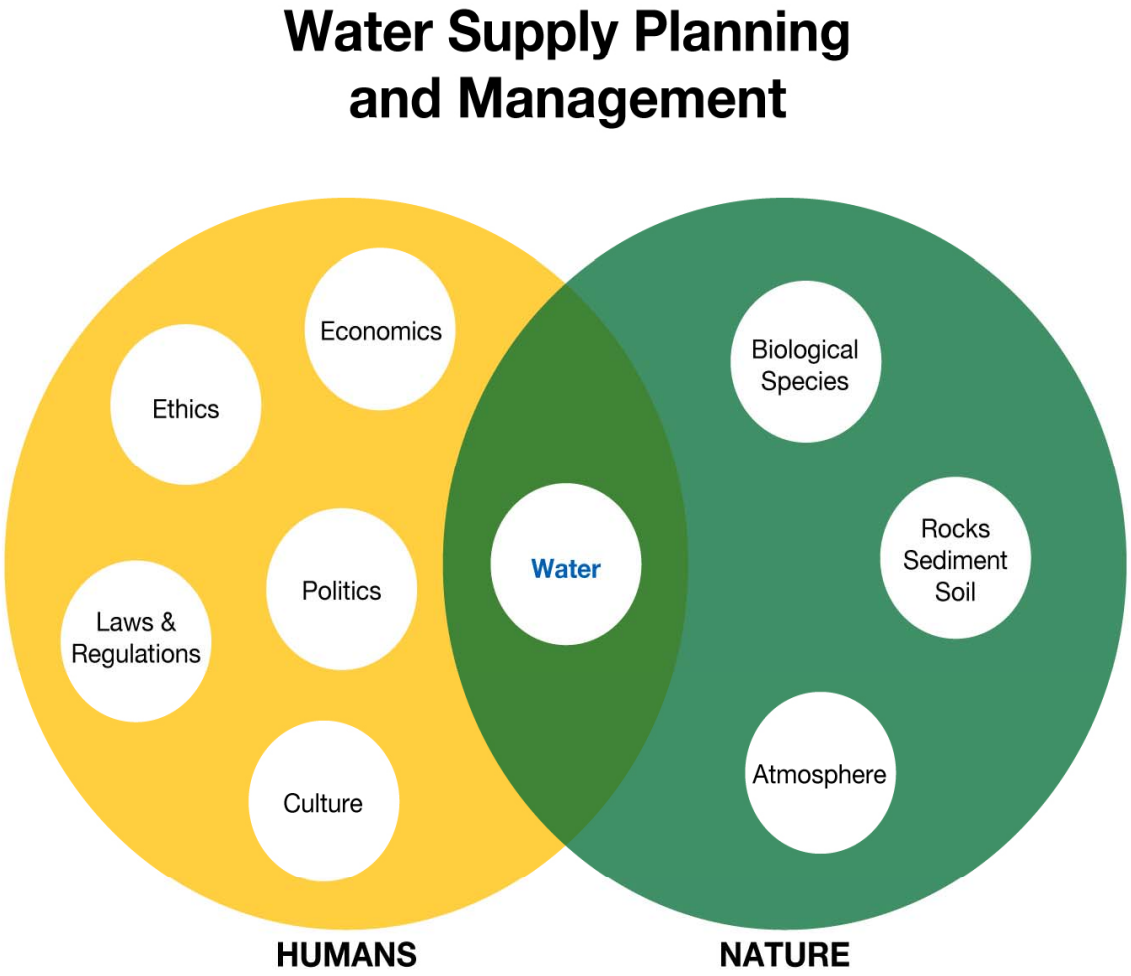
**TO ENSURE ADEQUATE SUPPLIES OF CLEAN WATER FOR ALL USERS**

**AT REASONABLE COST**

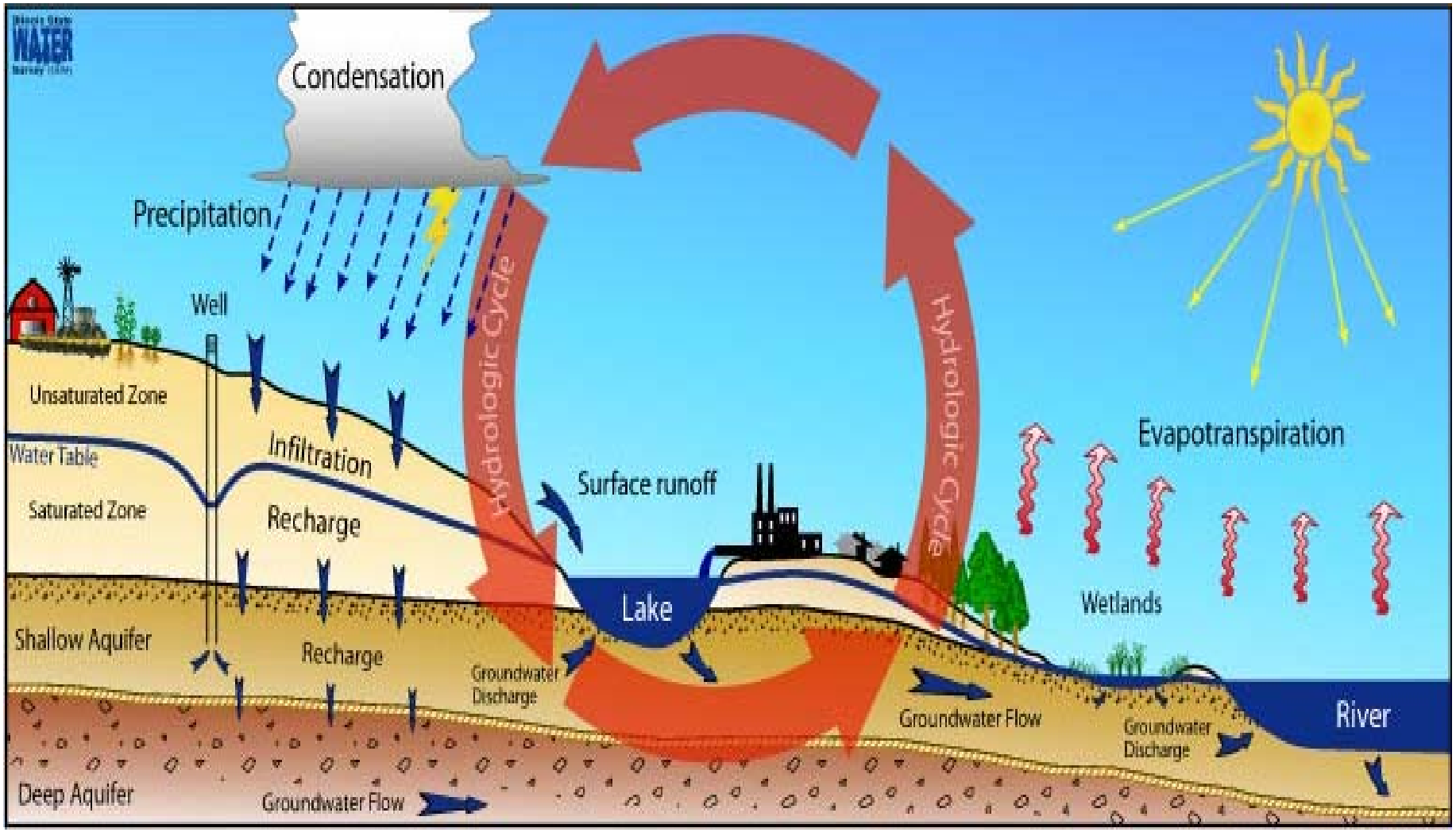
**WATER WILL NOT CONTINUE TO FLOW FROM THE FAUCET WITHOUT ADEQUATE PLANNING**

**Planning for an uncertain future entails risk assessment and risk management**

# WATER SUPPLY IS EMBEDDED IN ENVIRONMENTAL, ECONOMIC AND SOCIAL ISSUES



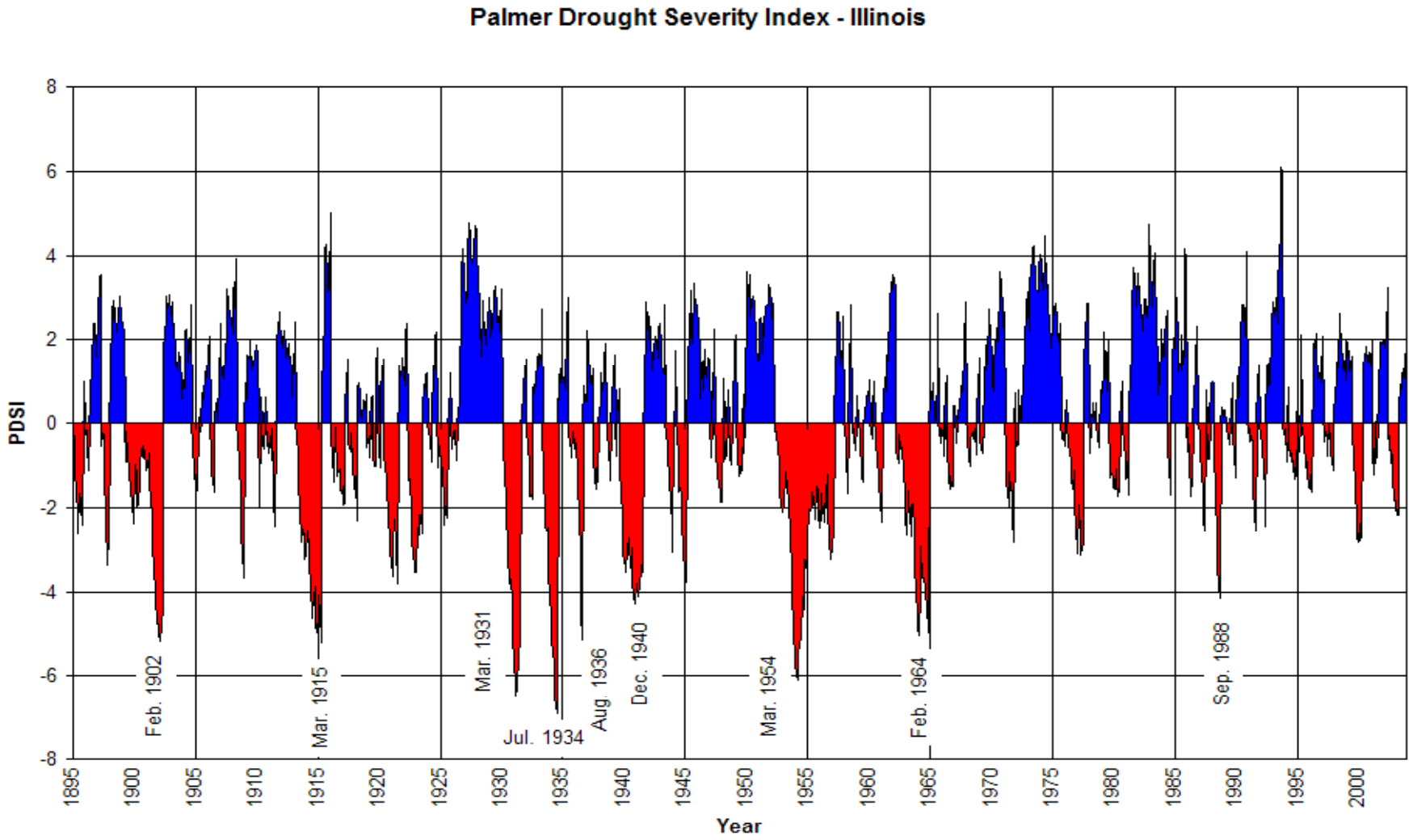
# THE WATER CYCLE:
## CLIMATE, SURFACE WATER and GROUNDWATER ARE INTERCONNECTED



# DROUGHT

- **Severe multi-year droughts have occurred periodically in the past and will occur again in the future.**
- **Droughts reduce water availability, increase water use, and create water shortages.**
- **Droughts must be planned for and managed.**

# DROUGHT FREQUENCY AND MAGNITUDE IN ILLINOIS
# (M. Palecki, ISWS)
# LAST 40 YEARS RELATIVELY FREE FROM MAJOR MULTI-YEAR DROUGHTS (RED)



# DROUGHT PLANNING AND MANAGEMENT

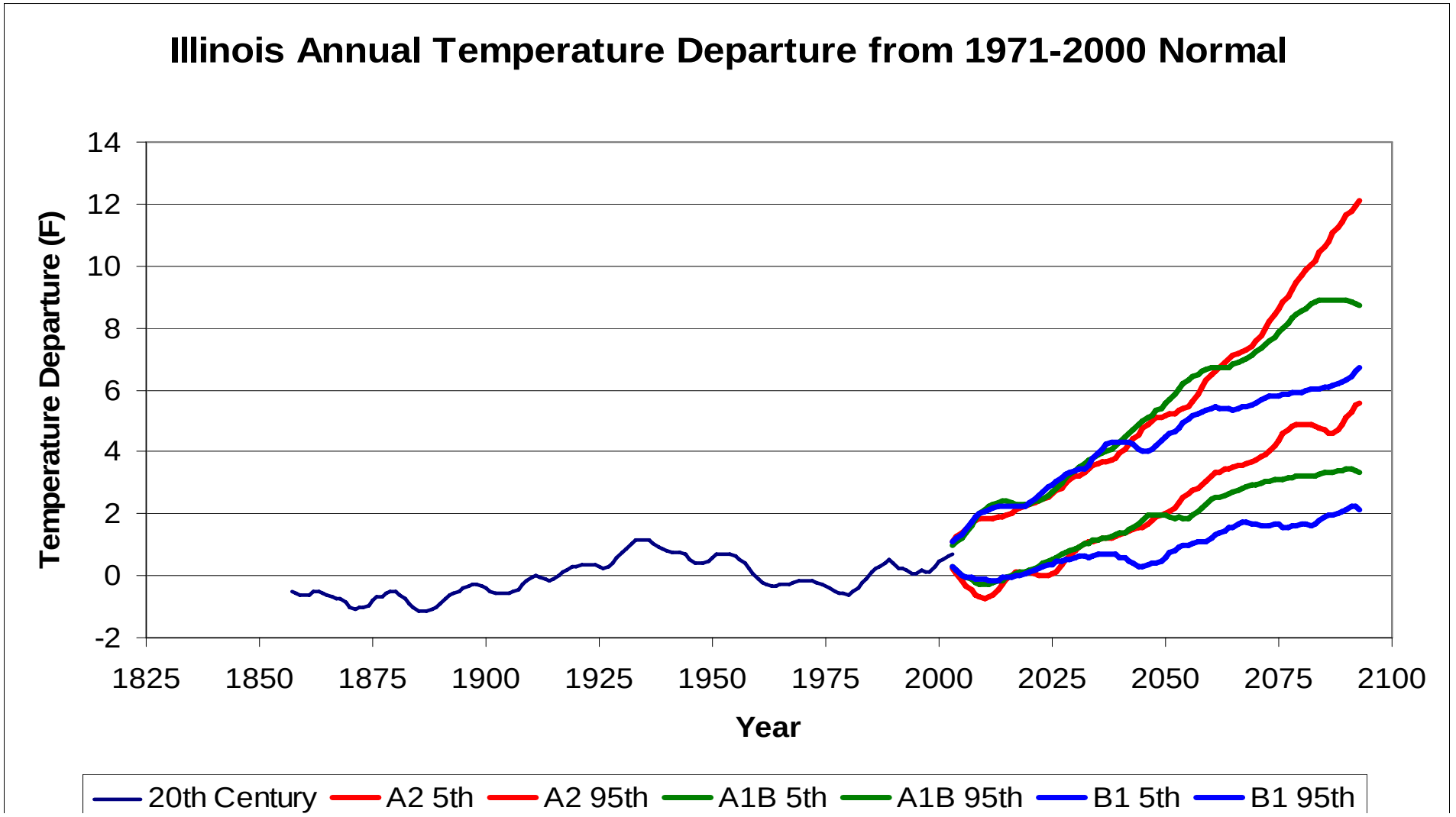
- **RISK ASSESSMENT & MANAGEMENT**
  - **1 in 50 year droughts?**
  - **1 in 100 year droughts?**
  - **worst-case droughts?**
- **DROUGHT PREPAREDNESS**
- **DROUGHT RESPONSE**

# CLIMATE CHANGE

- **Warmer – probably**
  - **higher temperature increases water demand and reduces water availability**

- **Wetter or drier – don't know**
  - **drier conditions, like drought, increase water demand and reduce water availability**

# RESULTS FROM 120 GLOBAL MODEL RUNS UNDER HIGH, MEDIUM and LOW EMISSIONS SCENARIOS (ASC/AWS). 5th and 95 percentiles shown.



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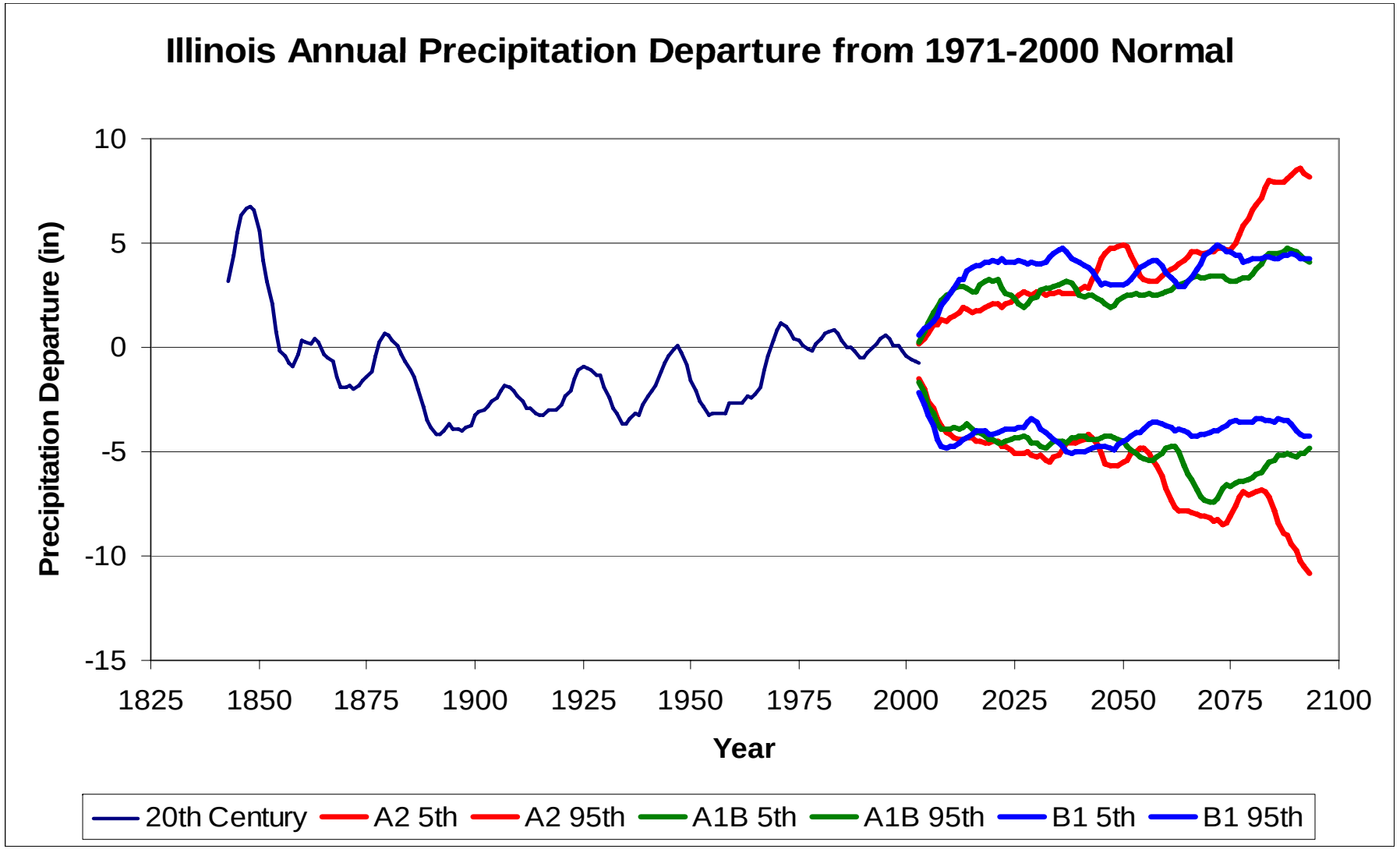
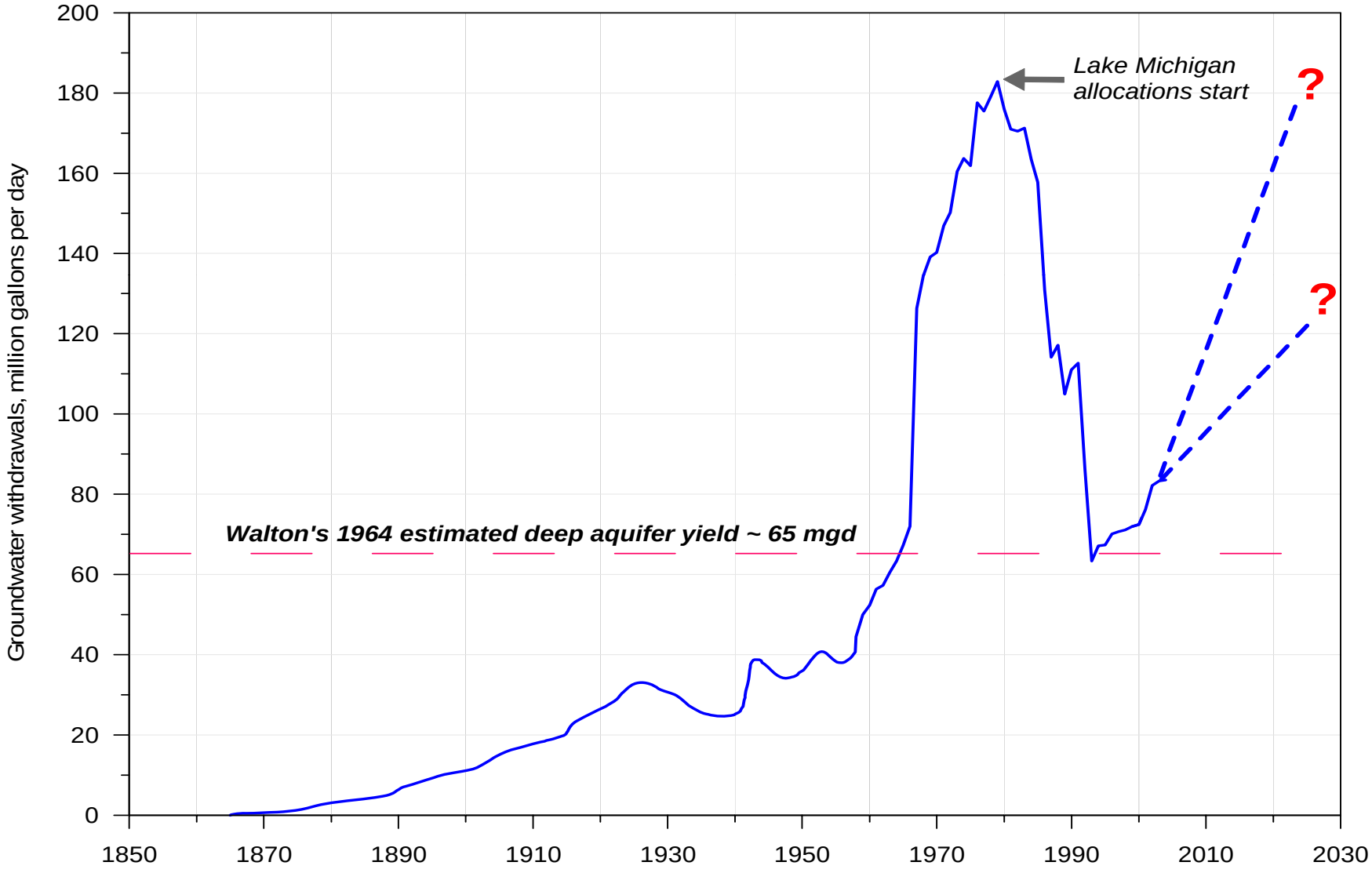
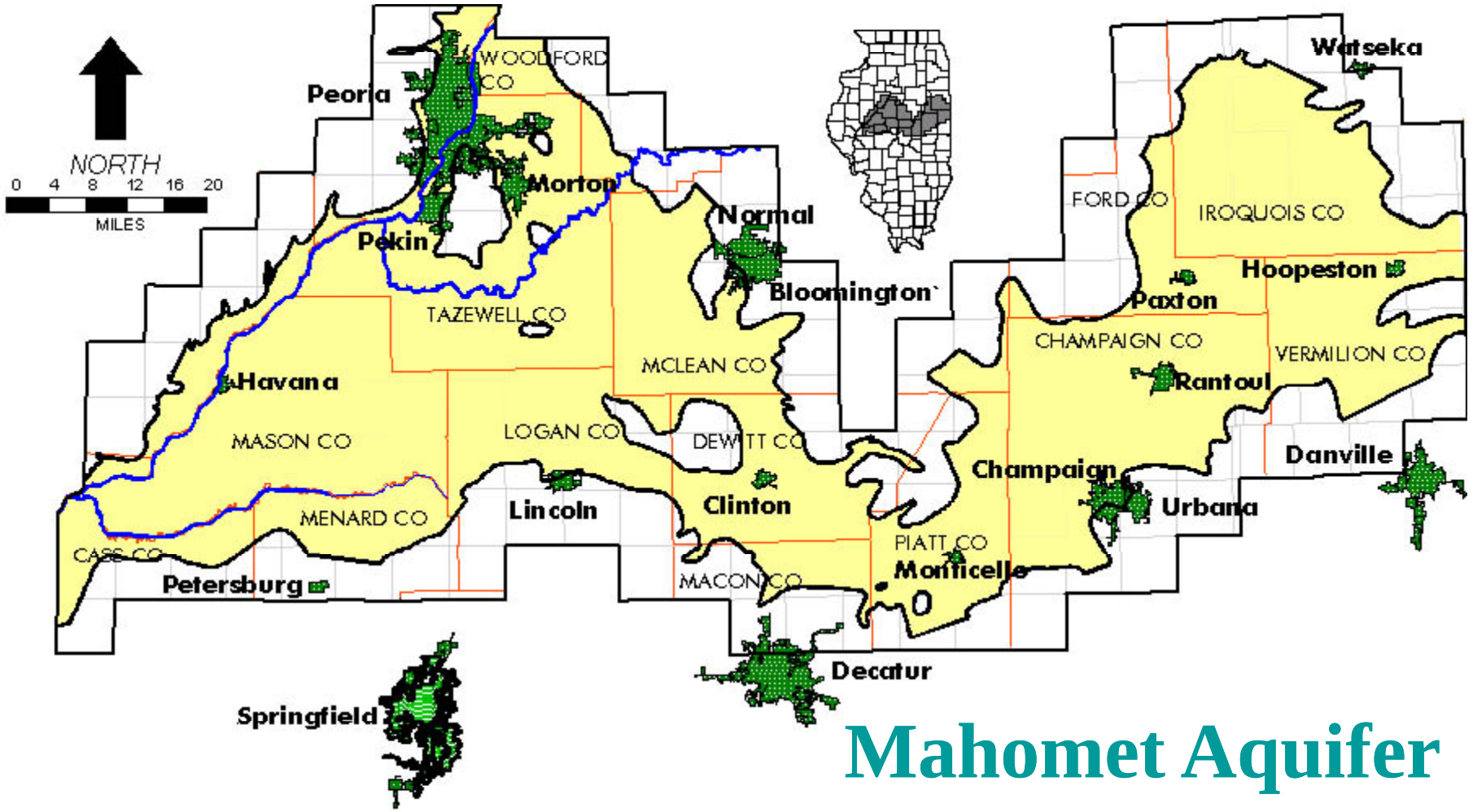


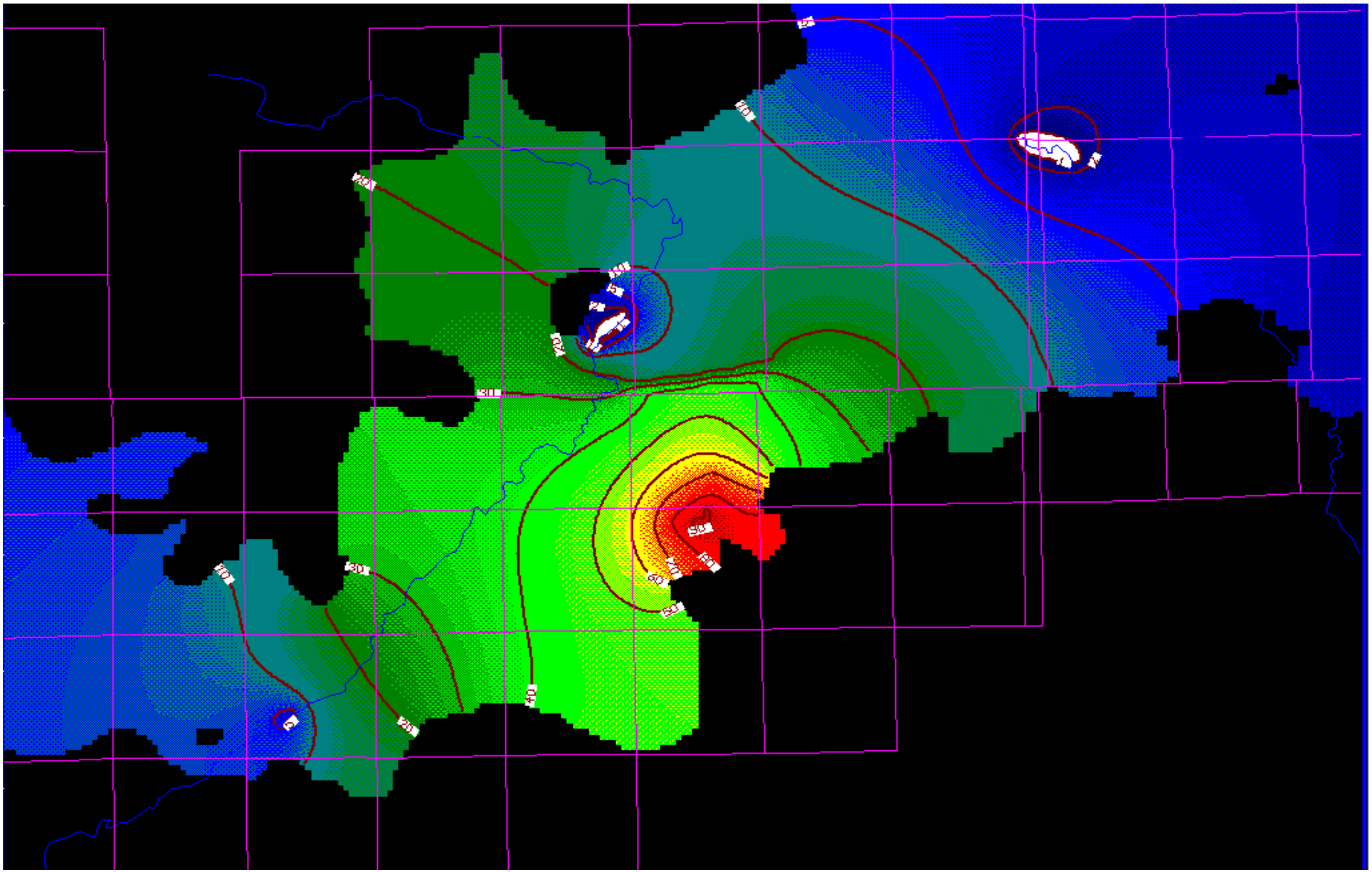
# How much more water can we withdraw from the deep aquifers of NE Illinois? (GSC/ISWS)





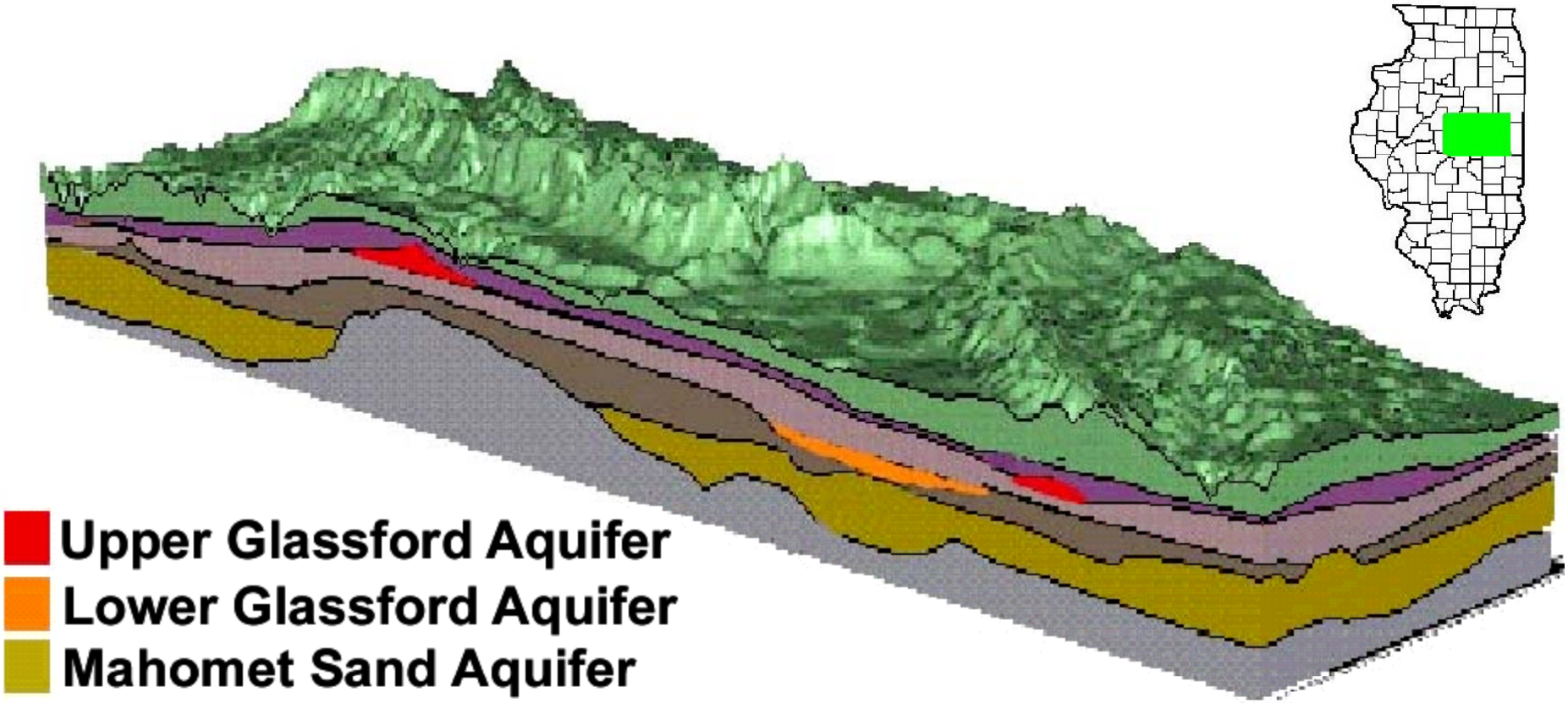

# Mahomet Aquifer

# Simulated Drawdown from IAWC Wellfield 2005 draft (George Roadcap, ISWS)



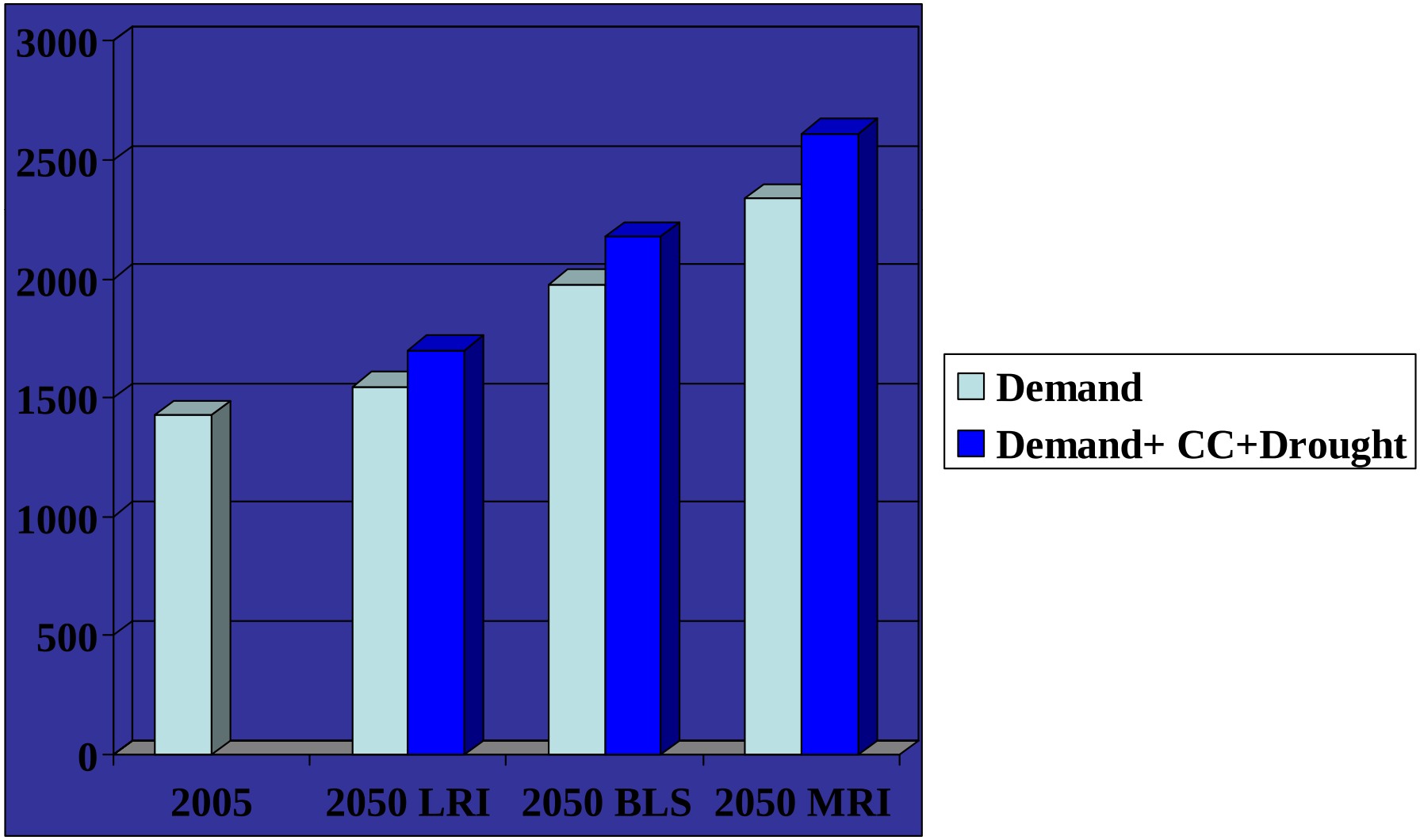
# MAHOMET AQUIFER Hydrogeology *(ISGS)*

***The need for good hydrogeological data to model***

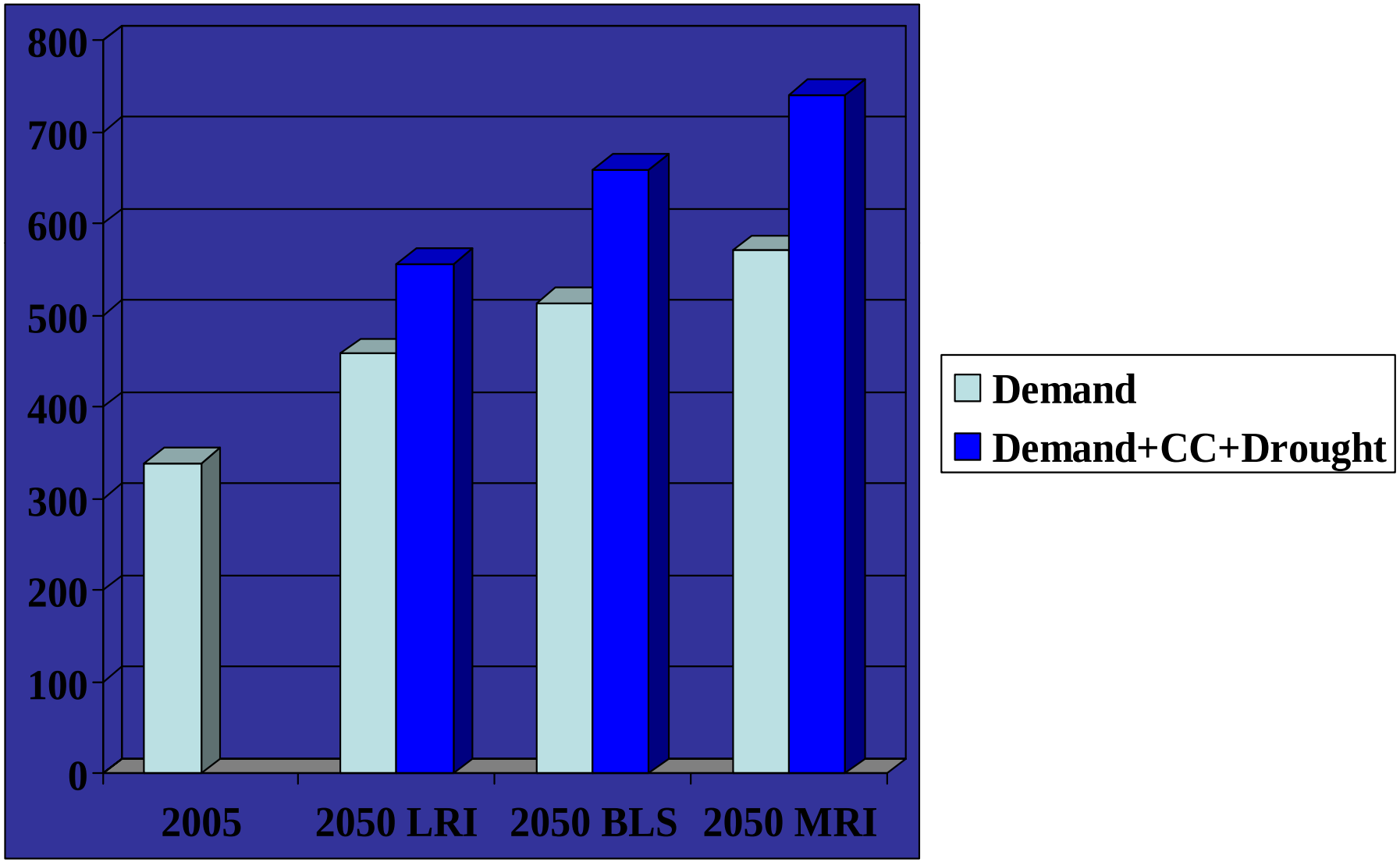


# WATER DEMAND TO 2050 (mgd): 11 COUNTIES NE ILLINOIS

**(data from Ben Dziegielewski, 2008)**



# WATER DEMAND TO 2050 (mgd):
# 15 COUNTIES EAST-CENTRAL ILLINOIS
## (data from Wittman Hydro Planning Associates, Inc, 2008)



# WHAT IMPACTS AND COSTS ARE SOCIALLY ACCEPTABLE?

- **Drawdown?**
- **Impacts on existing wells?**
- **Reduction in surface-water flows?**
- **Changes in regional groundwater flow?**
- **Dewatering an aquifer?**
- **Water quality?**
- **Desalinating water?**
- **Transporting water from the Mississippi?**

# CONCLUSION:
# SOME KEY QUESTIONS

- **How much more water can be allocated from the Lake Michigan Diversion?**
- **How much more water can be withdrawn safely from rivers and aquifers?**
- **What are sustainable yields?**
- **How much can the price of water be increased to reduce demand and increase supply?**
- **How much reduction in water demand can be achieved by water conservation and reuse?**
- **What magnitude and frequency of drought should we be prepared for?**
- **What risk of climate change should we be prepared for?**

# WE DO KNOW THAT …

- **WITHOUT ADEQUATE PLANNING THERE WILL BE THREATS TO THE ENVIRONMENT, ECONOMIC DEVELOPMENT AND SOCIAL WELL BEING. COMPETITION AND CONFLICT.**
- **WE ARE ENGAGED IN 2 PILOT PROJECTS FOR REGIONAL WATER SUPPLY PLANNING AND MANAGEMENT.**
- **A PERMANENT STATEWIDE PROCESS MUST BE PUT IN PLACE AND FUNDED.**

# THE END

## MORE INFORMATION

## http://www.sws.uiuc.edu/wsp