WATER SUPPLY PLANNING AND MANAGEMENT: SUSTAINABILITY

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ISWS
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HOW TO MANAGE REGIONAL WATER SUPPLIES?

• Business as usual? Reasonable use.
• Change?
• Many pieces to the jigsaw puzzle (supply; demand; impacts of withdrawals; conservation; reuse; surface water; groundwater; conjunctive use; climate change; droughts; time horizons;)

HOW TO MANAGE REGIONAL WATER SUPPLIES? (contd.)

• Previously not had a process and structure for regional planning and management (other than LM diversion)
• Governor established an administrative process and structure for regional planning and management
• RWSPG needs develop a framework for making management recommendations
• The concept of sustainability offers an opportunity for developing such a framework
• If not sustainability, what other framework?
GOAL OF WATER SUPPLY PLANNING:

TO PROVIDE ADEQUATE SUPPLIES OF CLEAN WATER FOR ALL USERS AT REASONABLE COST
THE WATER CYCLE: 
A PHYSICAL AND BIOLOGICAL FRAMEWORK FOR REGIONAL WATER SUPPLY PLANNING AND MANAGEMENT
Water Supply Planning and Management

HUMANS
- Ethics
- Politics
- Culture
- Laws & Regulations
- Economics

NATURE
- Water
- Biological Species
- Rocks
- Sediment
- Soil
- Atmosphere

Water
SUSTAINABILITY

“meeting current needs without compromising the opportunities of future generations to meet their needs”

World Commission, 1987
GROUNDWATER SUSTAINABILITY

“.. development and use of groundwater in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences.”

USGS Circular 1186, 1999
SUSTAINABILITY RECOGNIZES:

- Present and future generations
- The value of water supply
- Shared responsibilities
- Renewable but not limitless water supply
- Stewardship
- Reasonable use and acceptable impacts
- Maintenance of integrity of societal and ecological systems
- Adaptability and flexibility to deal with uncertainties and risks
NON-SUSTAINABLE MANAGEMENT INCLUDES:

- Inadequate consideration of future generations
- Undue recognition of the value and limits of water
- Singular decision making
- Unreasonable use, unacceptable impacts, and high costs
- Imbalance between meeting societal and ecosystem needs
- Inability to deal with droughts, climate change etc.
Does A Reservoir In Illinois Offer A Sustainable Water Supply?
Does A Reservoir In Illinois Offer A Sustainable Water Supply?

• May be, may be not!
• Depends on definition of sustainability
• Critical considerations: time, costs and acceptable impacts
• Sustainable until water storage capacity is no longer adequate to meet needs – reduced supply (e.g., droughts; sedimentation)
• Sustainable until costs of dredging, enlarging the reservoir, or preventing sedimentation become too high
IS WITHDRAWING LARGE AMOUNTS OF WATER FROM AQUIFERS SUSTAINABLE?

- Safe yield: withdrawals = recharge
- BUT withdrawals can e.g., reduce streamflow; dewater aquifers; cause existing wells to go dry; cause deterioration in water quality
- Often decades to centuries for groundwater flow system to come to new equilibrium
- Safe yield is not necessary sustainable
- Critical considerations: acceptable impacts and costs
Water Use - Long-term trend at Champaign

Graph showing the water use trend at Champaign from 1950 to 2010, with a steady increase in water usage over time.
Mahomet Aquifer Water Level [Head]
at Rising, near Champaign
Simulated Drawdown from IAWC Wellfield, draft 2005
SUSTAINABILITY THRESHOLDS?

- Critical levels for managing water supply operations, e.g., Q7/10
- Sustainable operations above thresholds
- Non-sustainable operations below thresholds
- Thresholds can be set by society based on acceptable/unacceptable impacts, costs, etc.
- Strategies can be implemented to ensure compliance with thresholds
- Do you wish to identify and recommend thresholds?
- Can you implement additional thresholds within existing laws, regulations and property rights?
- Can you achieve “sustainability” without changing laws, regulations and/or property rights?
Water Use - *Long-term trend at Champaign*

![Graph showing the long-term trend of water use at Champaign from 1950 to 2010. The graph indicates a steady increase in water use over time, with fluctuations around the trend line.](graph_image)
Mahomet Aquifer Water Level [Head]
at Rising, near Champaign
Decline in “head” west of Champaign preliminary)
CUMULATIVE IMPACTS WITH +10 MGD THRESHOLD

- +2 mgd
- +4 mgd
- +6 mgd
- TOTAL +12 mgd
CONSERVATION

- Reduce water demand and withdrawals
- Reduce impacts of withdrawals
- To what extent does conservation simply delay meeting critical thresholds and support further development?
Regional Water Supply Planning Committee

- Identify a framework within which you can pull all the pieces together and set goals, strategies etc.
- Do you wish to use sustainability as a framework for making management recommendations?
- If yes, you probably need to clearly define sustainability in an operational mode, otherwise perhaps not different from reasonable use.
- If not sustainability, will you adopt another framework?
- Identify the resources you wish to protect, preserve and enhance – water storage and flows, society, economy, ecosystems etc.
- Identify the impacts and costs that will be acceptable to you.
THE BALL
IS IN YOUR COURT!