Water Resources in McHenry County

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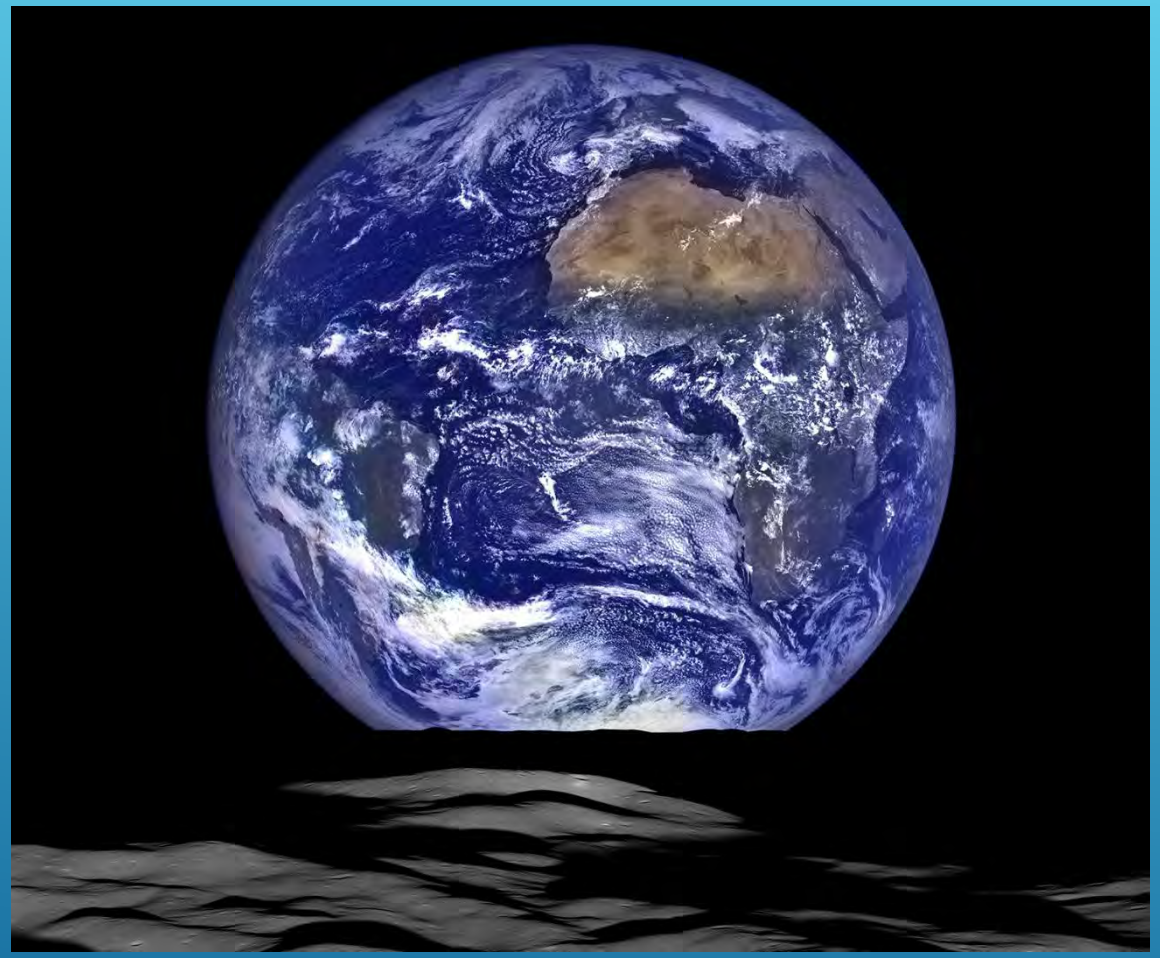
McHenry County Planning & Development

Presentation Will Cover:

1. Water Resources of McHenry County
2. Overview WRAP Update
3. Proposed Process, Scope of Work, Timeline

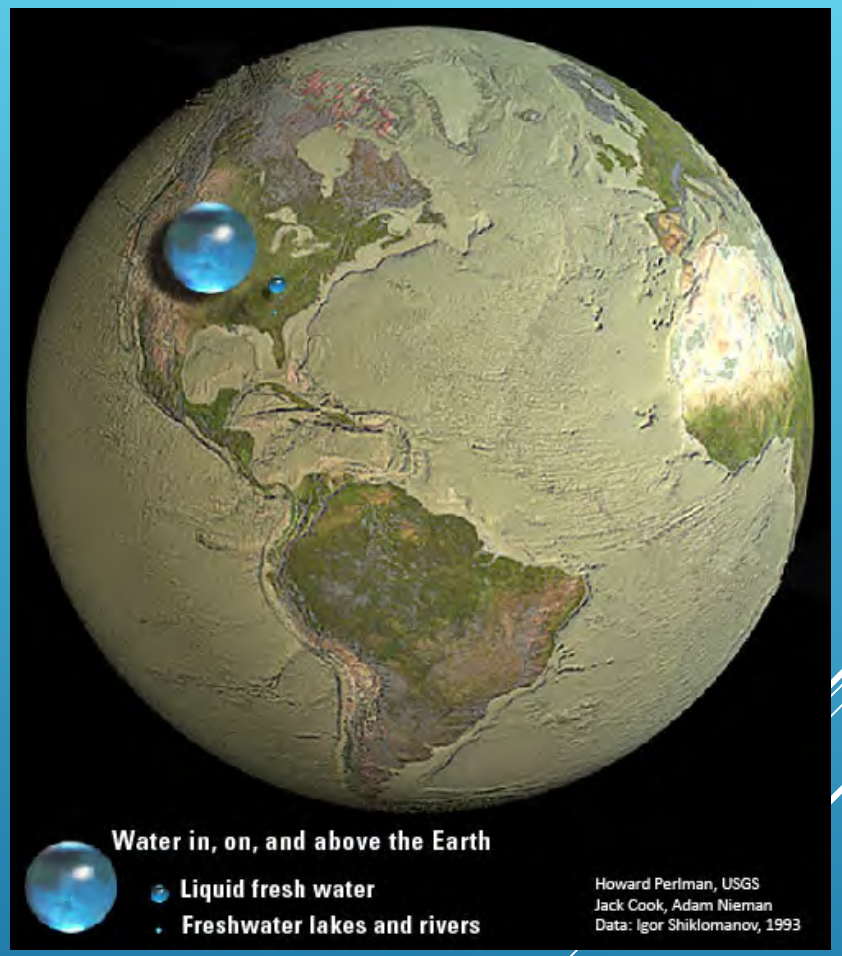
Consider this…



We live on a blue planet where about 75% of the Earth's surface is covered with water…

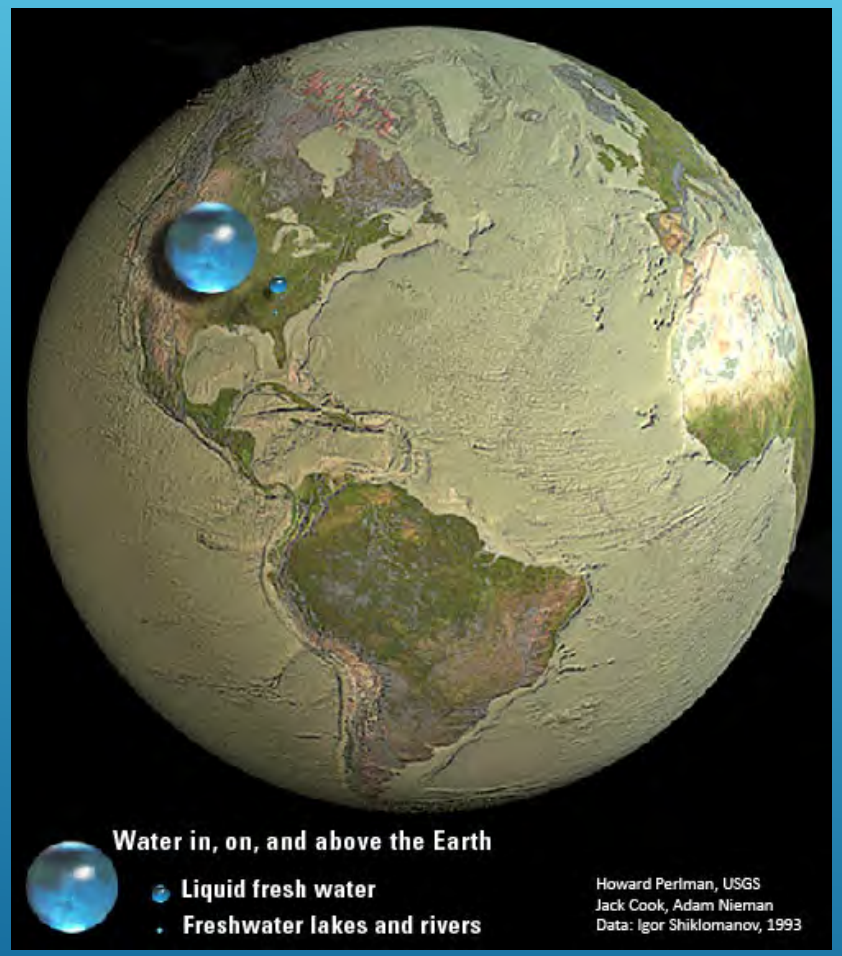
Consider this…

97.5% is ocean



only 2.5% is fresh water

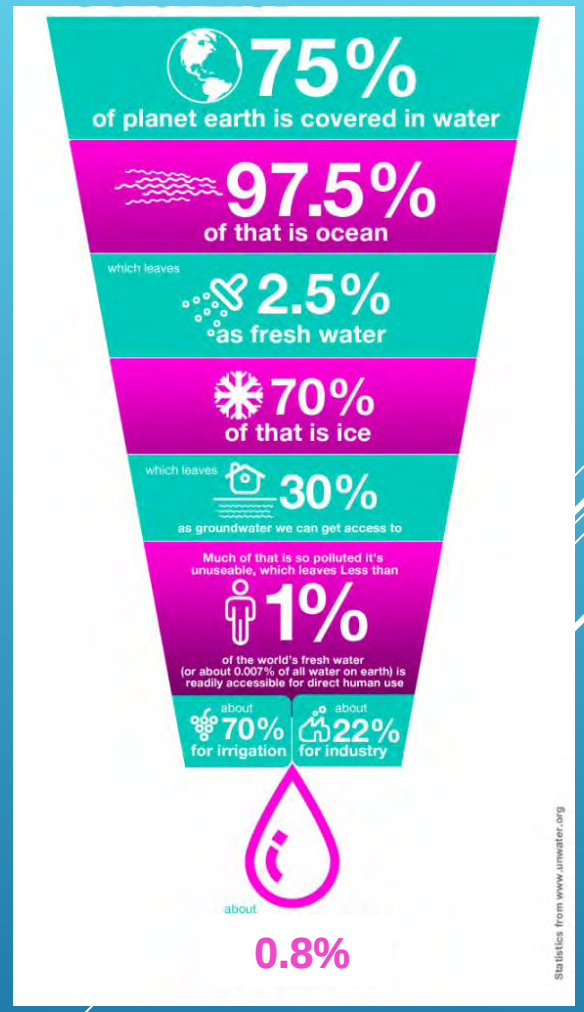
Consider this…



2.5% Fresh Water

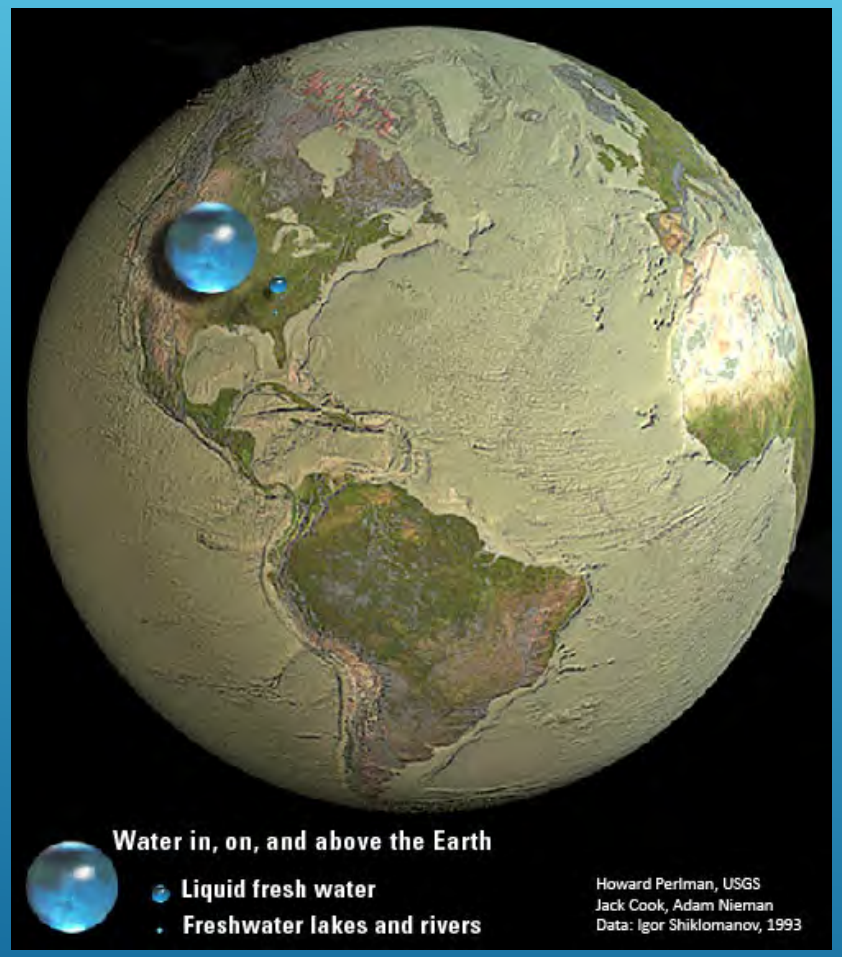
- 70% of that is ice

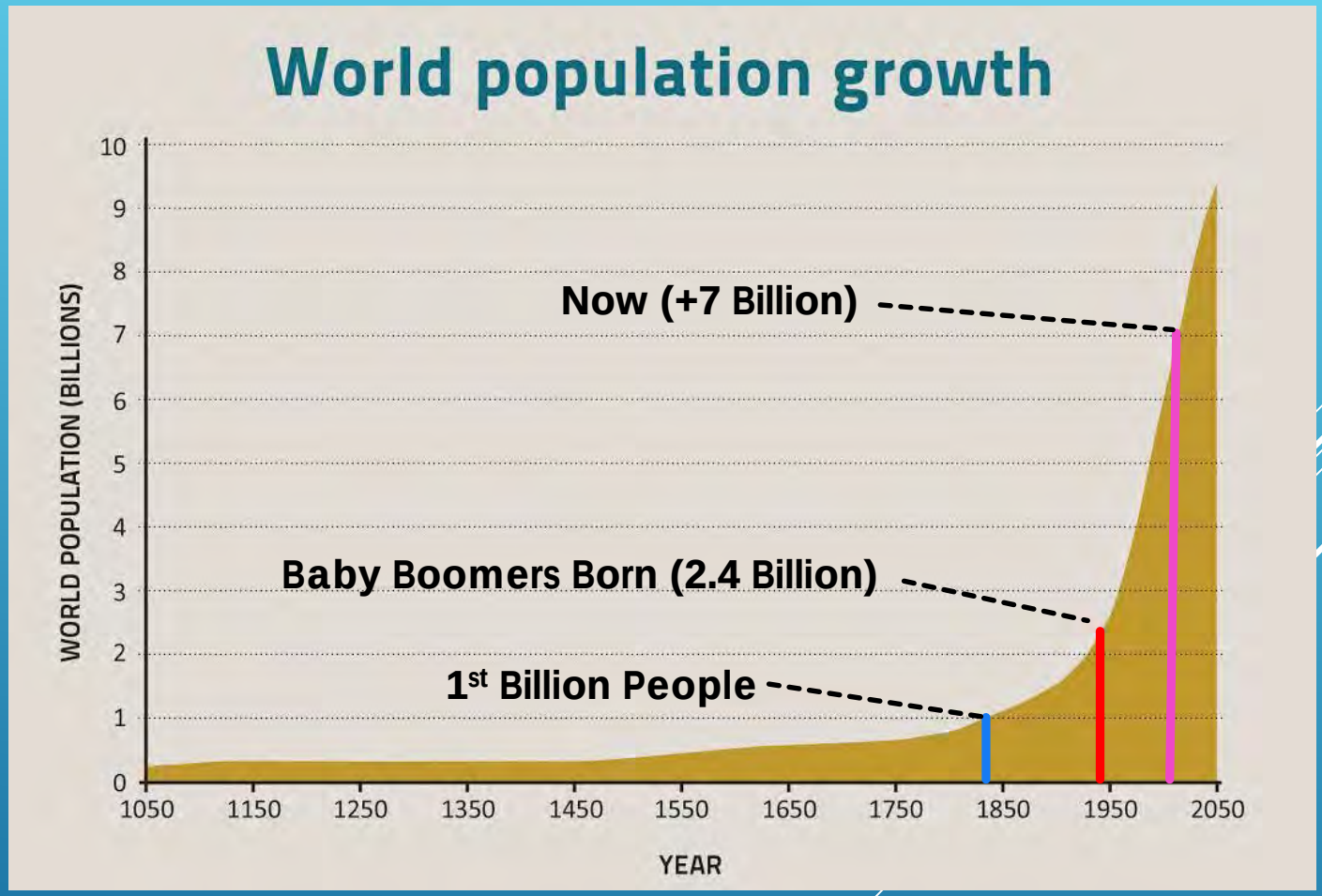
- Only 1% is clean & accessible
  - 70% used for Irrigation
  - 22% used for Industry
  - 0.8% for domestic use



Only about 0.8 % of all the fresh water on the planet is available for domestic use

Consider this…

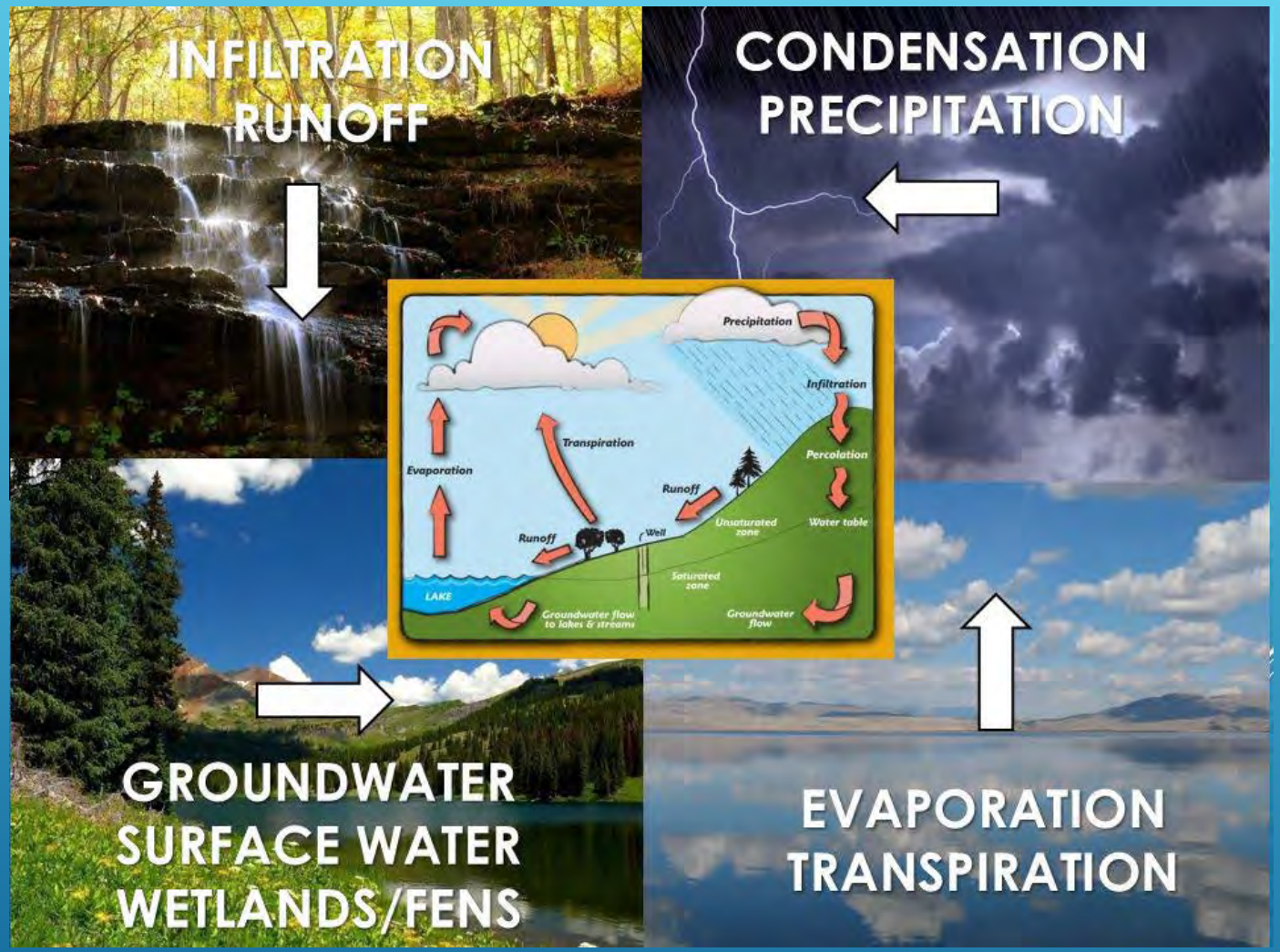




200 thousand years for 1st billion people, only 200 years for the next 8 billion people

More people competing for the 0.8% of available fresh water

Hydrologic Cycle



- Can naturally replenish water in much of the world
- Unless overconsumed, polluted, or overly disturbed

Our actions are polluting the 0.8%

WATER IS NECESSARY FOR ALL LIVING THINGS

WATER IS NECESSARY FOR ALL ECONOMIC DEVELOPMENT

Water is scarce in much of the world

- **By 2025: 2/3 of worlds population under water stress**

  1.8 billion people in absolute water scarcity

McHenry County is fortunate to have safe, sustainable water…

Only if we protect it!

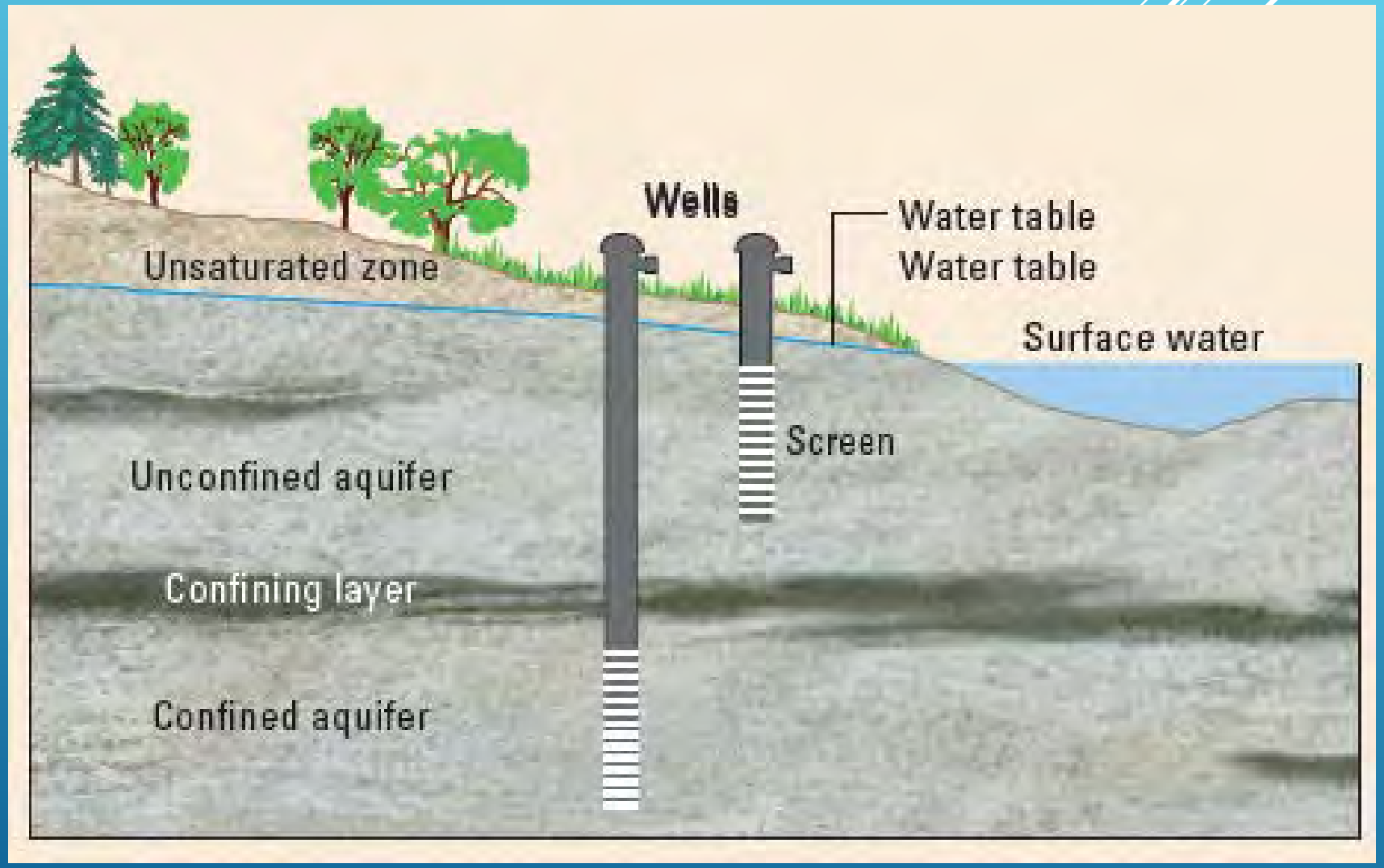
McHenry County: 100% Groundwater

Groundwater is stored in underground aquifers:

- **Sand and Gravel**
- **Limestone** (shallow bedrock)
- **Sandstone** (deep bedrock)

Wells installed to pump water from aquifers

- **Public wells**
- **Private wells**



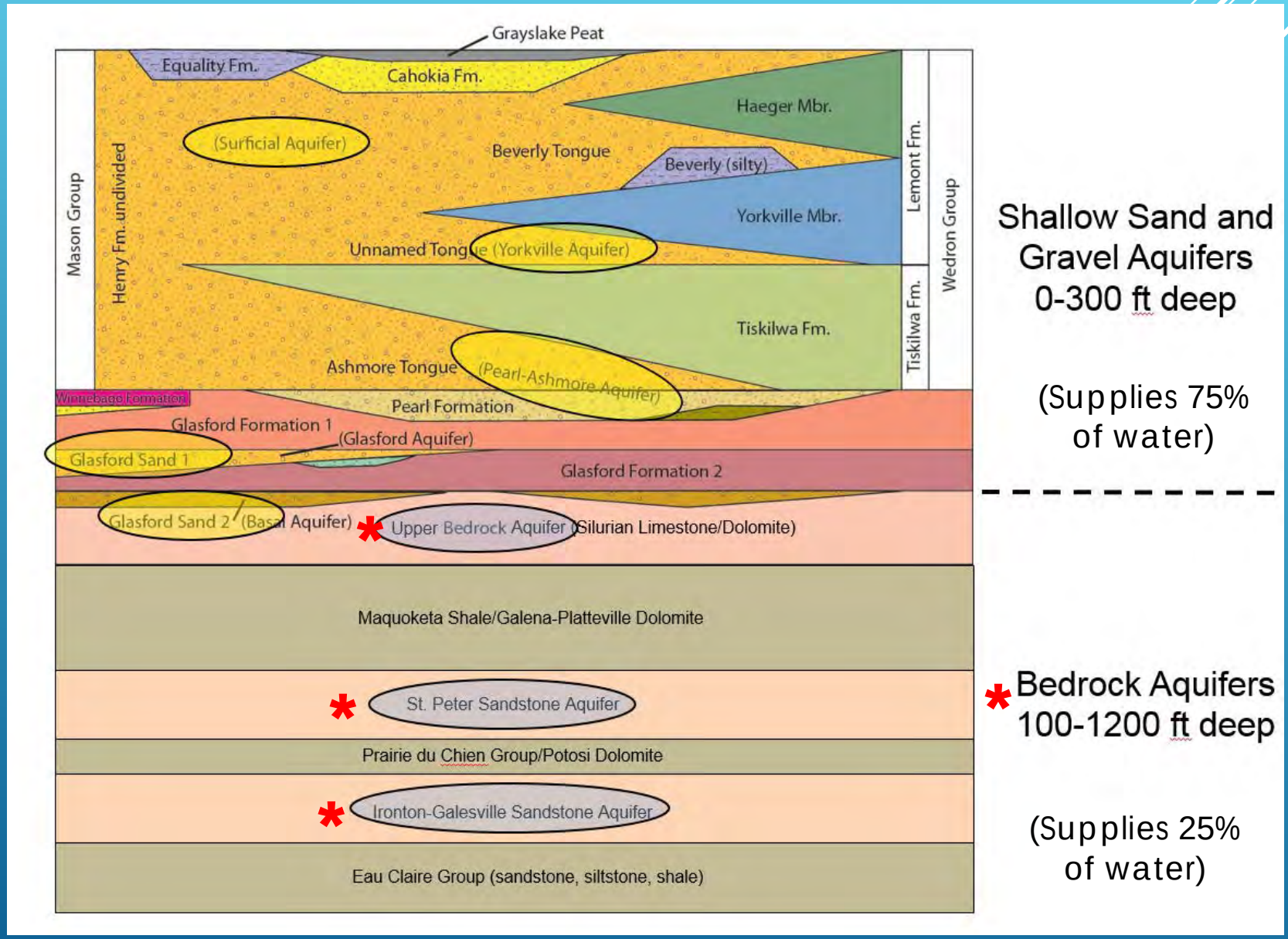
McHenry County Groundwater Aquifers

Sand & Gravel Aquifers

Limestone Aquifer

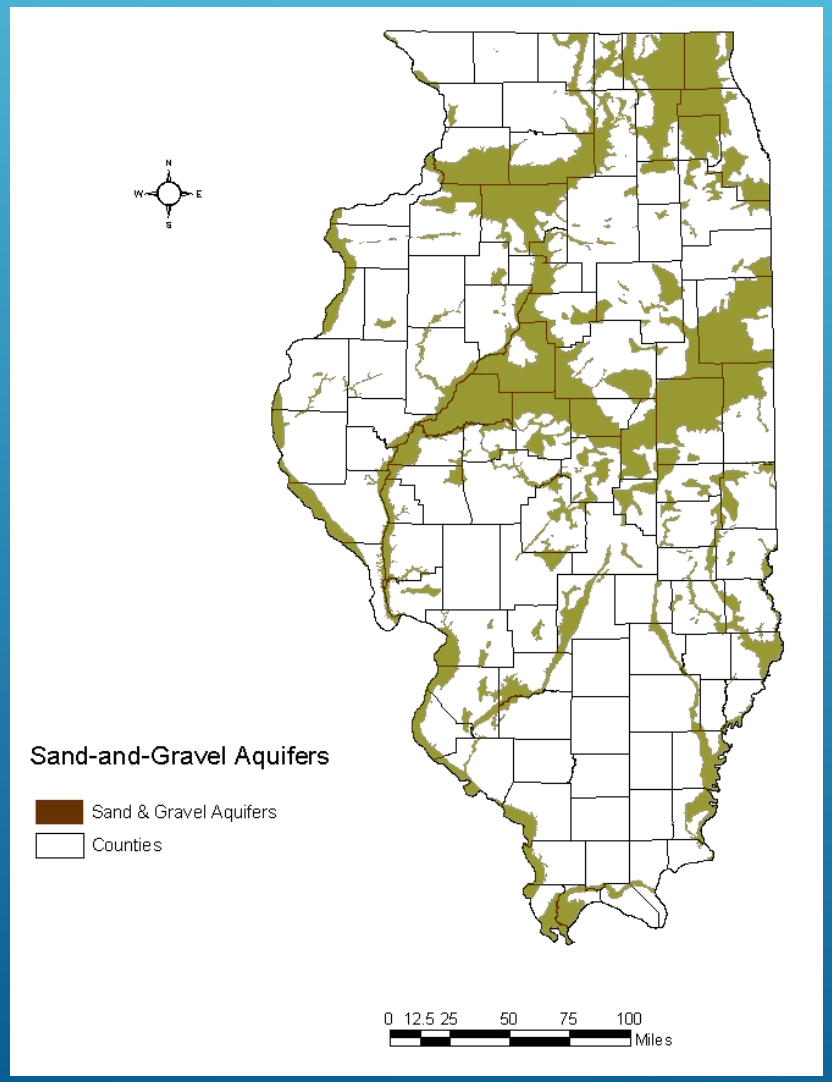
Sandstone Aquifer

Sandstone Aquifer

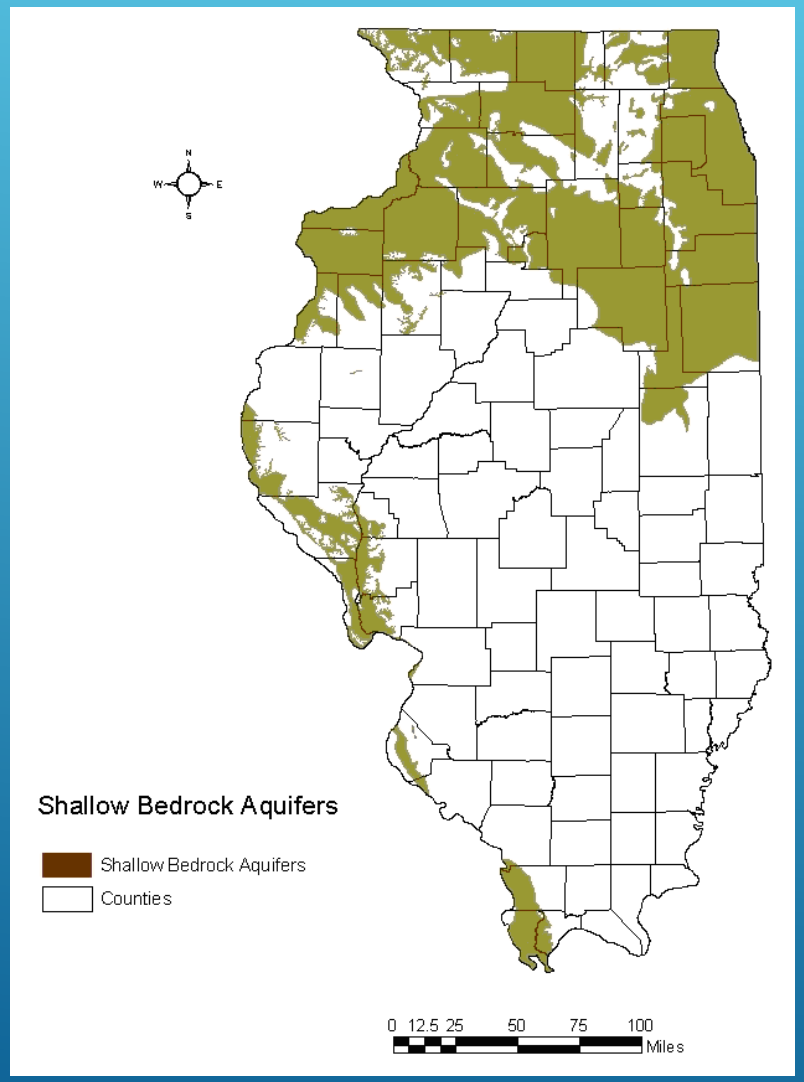


Groundwater Aquifer Distribution in Illinois

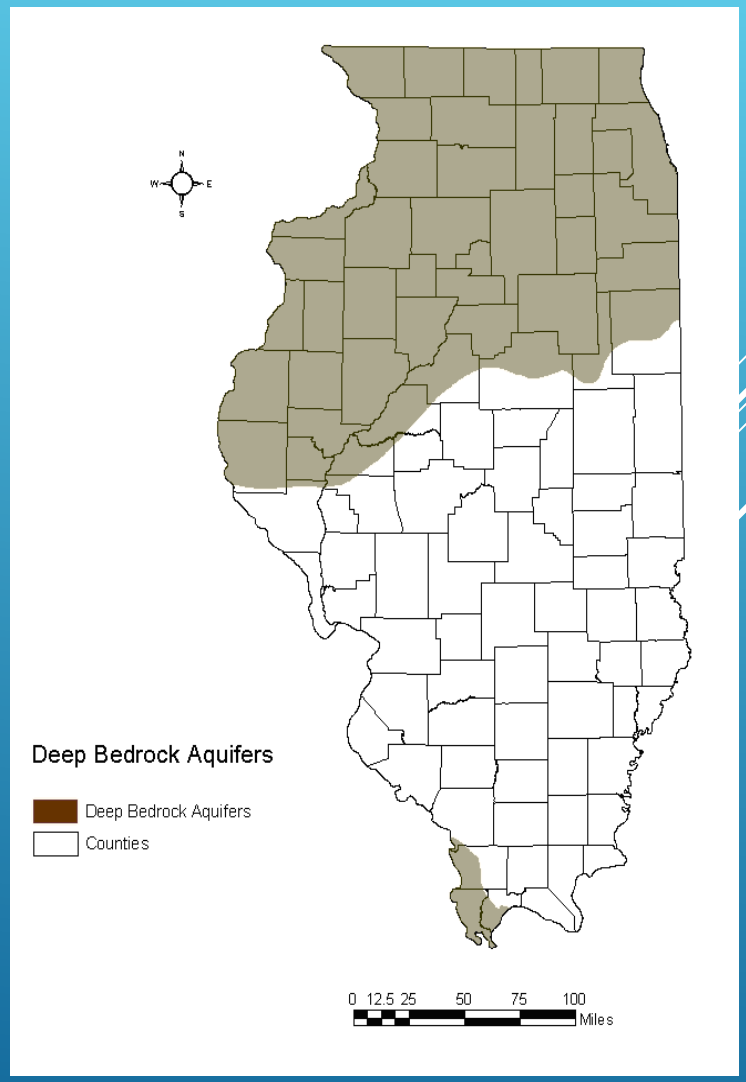
Sand & Gravel



Limestone

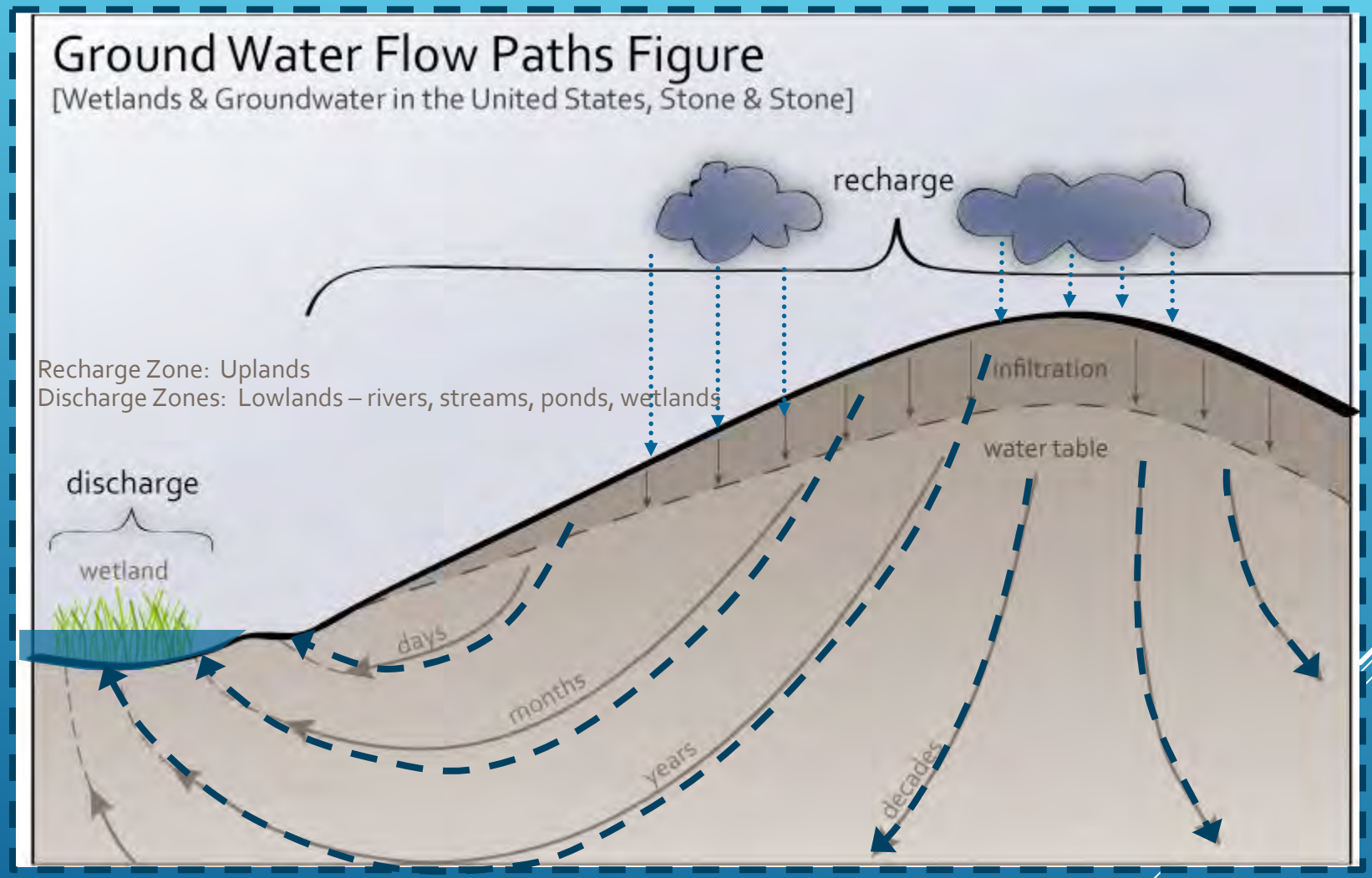


Sandstone



Natural Hydrology

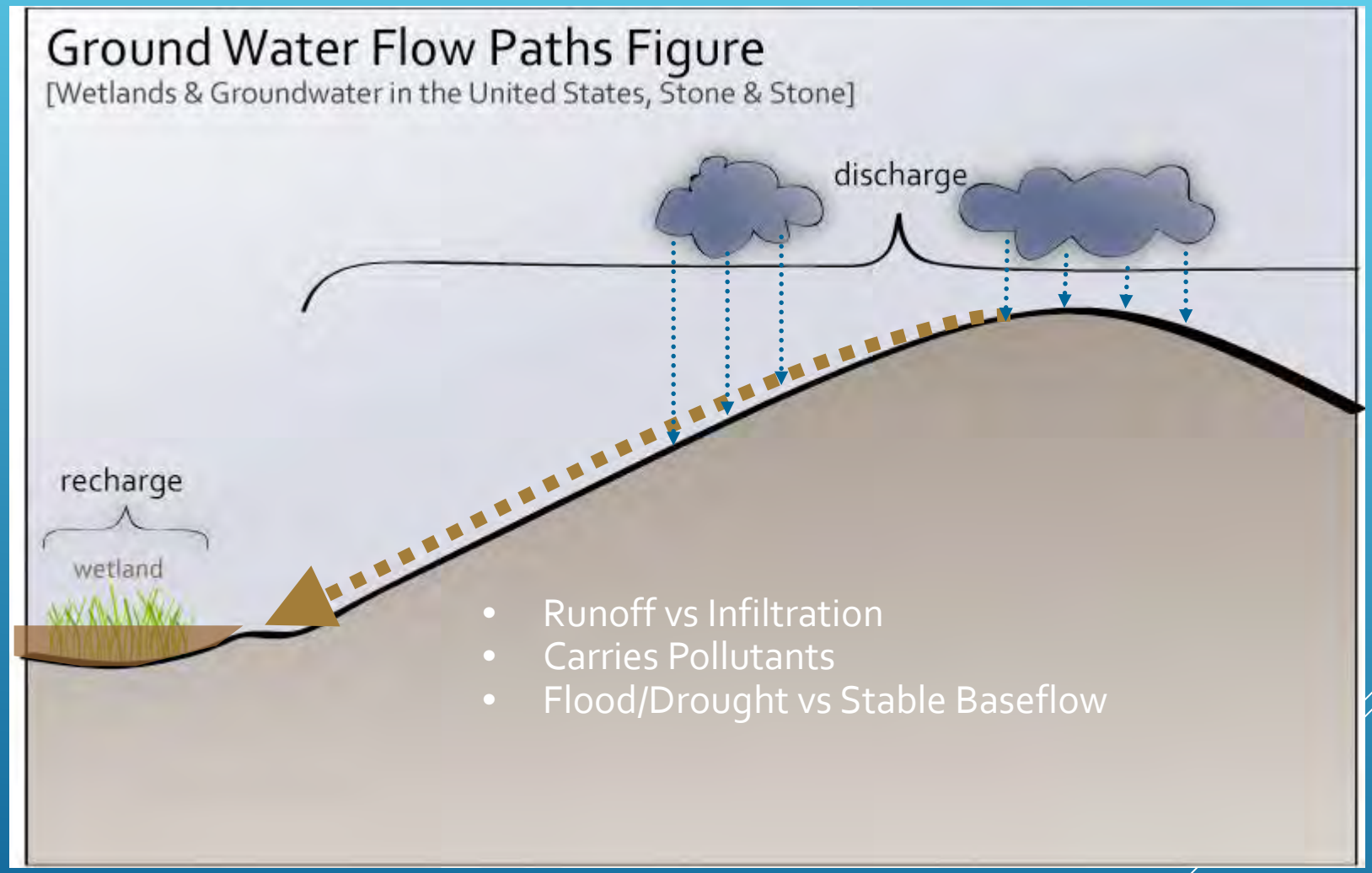
Slide courtesy of James Patchett and Conservation Design Forum



Constant, clean discharge flows, year round to sustain stable surface water hydrology with constant water temperature and chemistry

Degraded Hydrology

Slide courtesy of James Patchett and Conservation Design Forum



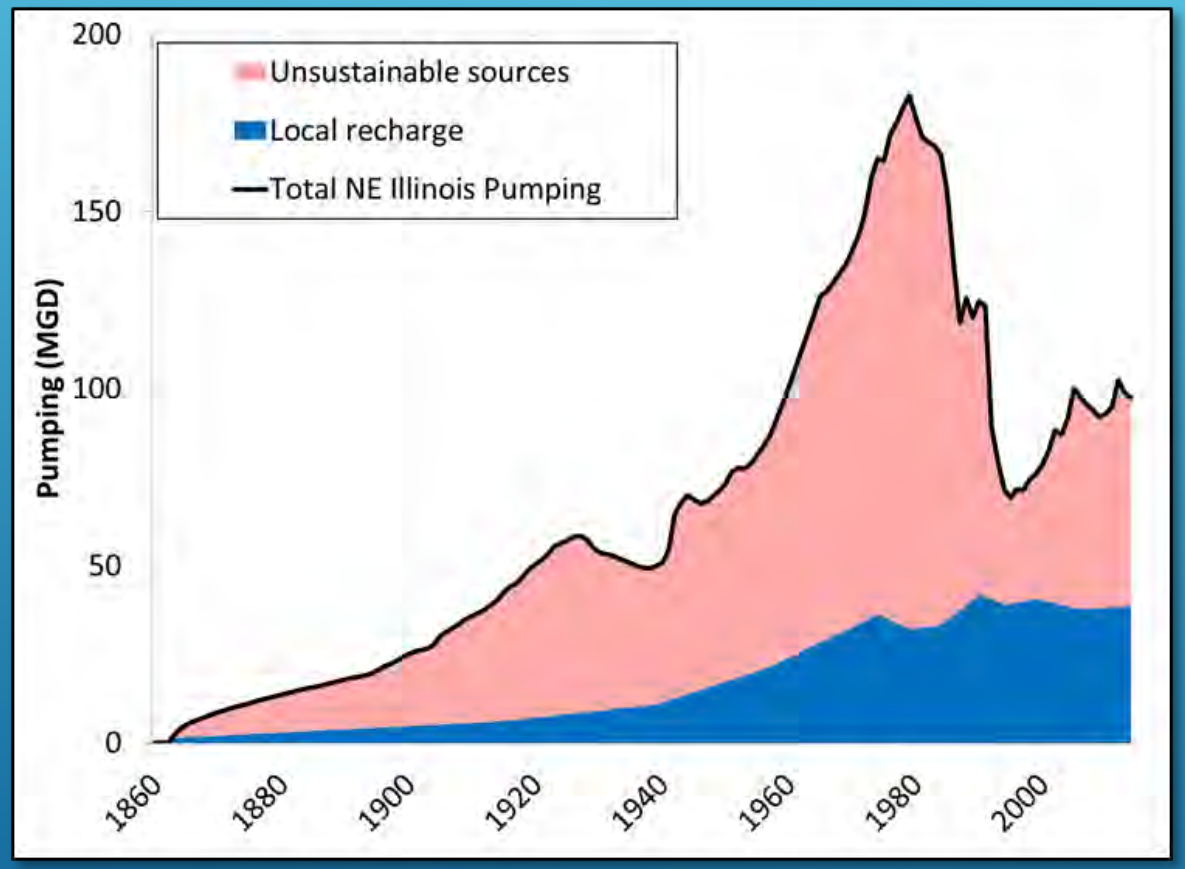
Reversed hydrological pattern results in runoff containing sediments, oils, greases, salts, fertilizers, pesticides, and higher water temperatures that inundate historical systems adapted to completely different hydrological and water quality conditions

Our Ground Water is Vulnerable…

- Over-Consumption (Finite Supply)
- Loss/Modification of Recharge Area
- Drought (supply decreases/demand increases)
- Contamination (including salt)

Over Consumption…

Groundwater Demand vs. Recharge NE Illinois



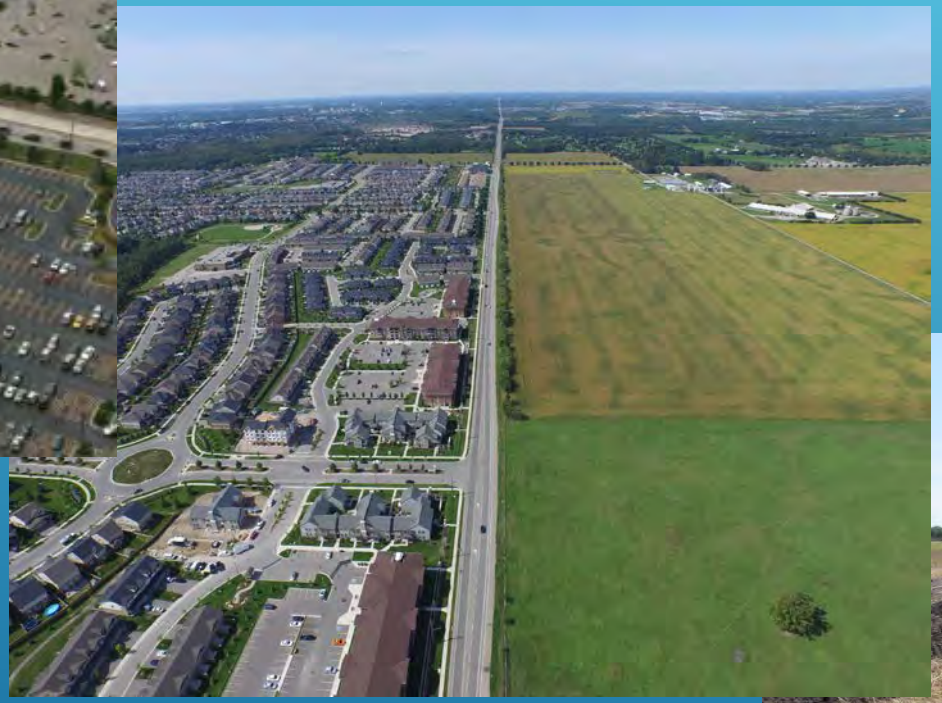
Data provided by Illinois State Water Survey

Sustainable Yield vs. Current Demands
Deep Bedrock Aquifers NE Illinois

County	Sustainable Yield*	Current Demands	Percent Sustainable
Cook and DuPage	8	11	72%
Grundy	7	8	88%
Kane	**17**	**27**	**63%**
Kendall	**2**	**9**	**22%**
Lake	5	5	100%
McHenry	8	8	100%
Will	**12**	**30**	**40%**

MGD

Loss of Groundwater Recharge/Natural Hydrology…



Drought…

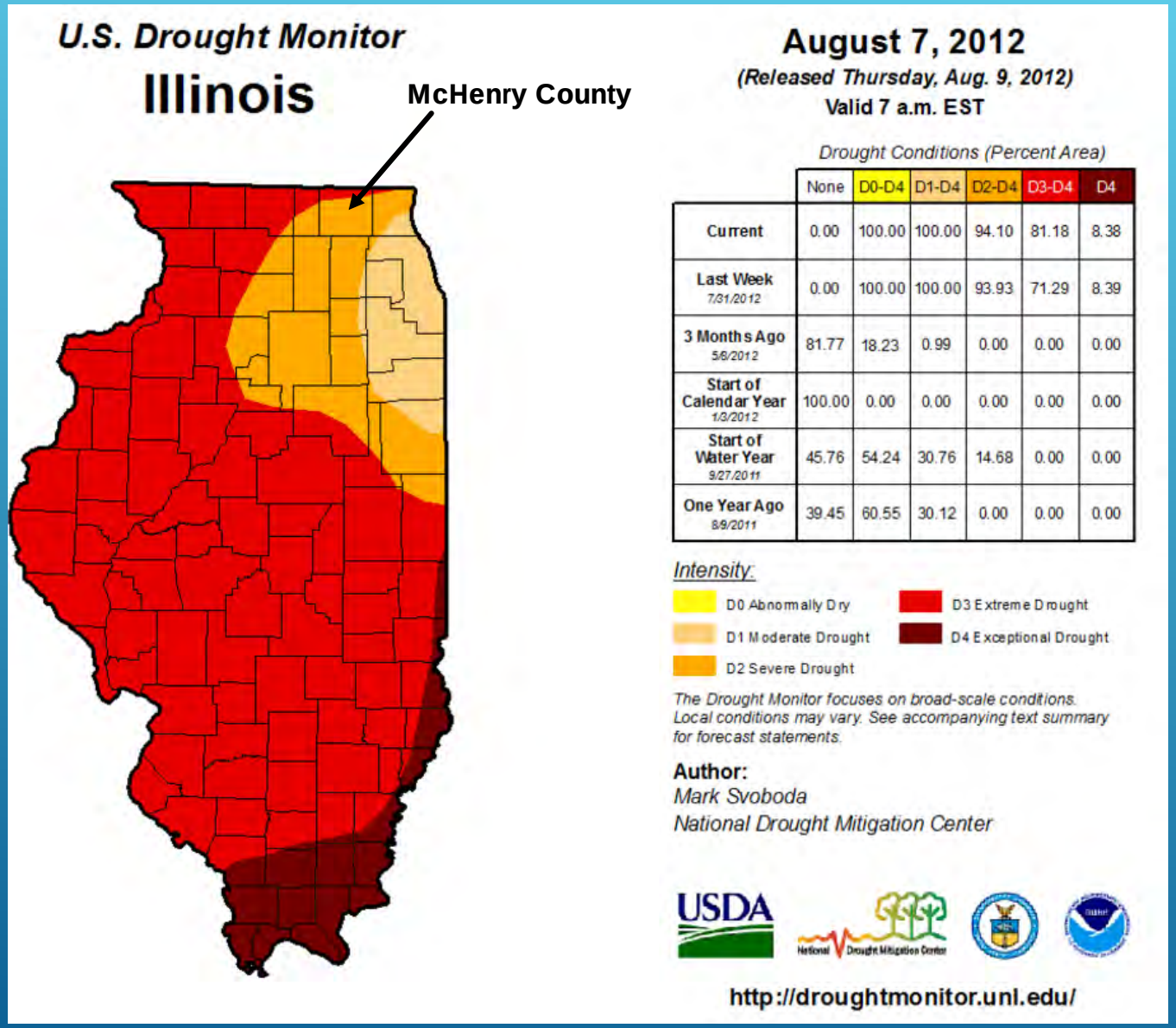
"Period of unusually persistent dry weather that continues long enough to cause serious problems such as crop damage and/or water supply shortages"

(McHenry County National Hazards Mitigation Plan)

During periods of drought:

- Groundwater recharge decreases
- Water use increases across all sectors (SIUC):
  - Public-supply withdrawals increase by 5%
  - Commercial and Industrial withdrawals increase by 5.5-5.6%
  - Irrigation and Agricultural withdrawals increase by 50%

Drought conditions in 2012



2012 Drought
Major Drop in Water Levels

CONTAMINATION…

We use lots of salt!

And it's contaminating our water

- **Road Salt**
- Water Softeners
- Fertilizers

Salt is a Chemical

- Toxic to Fish &Wildlife
- Kills Vegetation
- Highly Corrosive (metal/Infrastructure)
- Adverse Health Impacts

Permanent Water Impacts from Salt

1 teaspoon:

Permanently contaminates 5 gallons of water

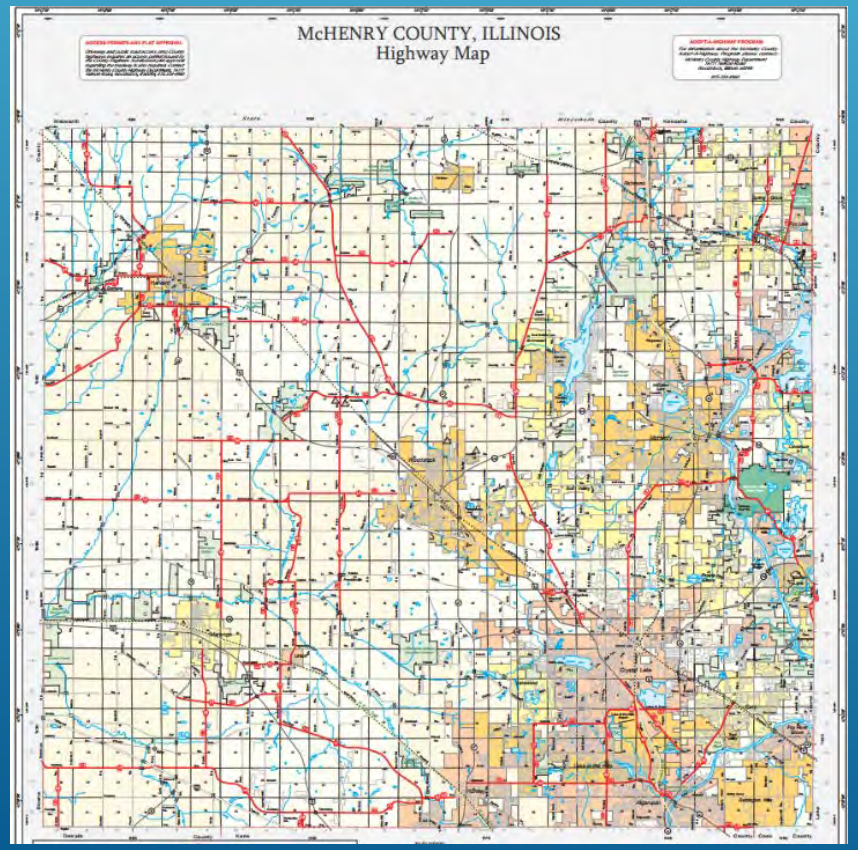
24,000 pounds = 48,000 cups = **2,400,000 teaspoons:**

Contaminates 65,753 years worth of drinking water for a person

Makes 500,000 gallons of water unlivable to fish

We use lots of salt!

McHenry County has approximately 2,500 miles of roadway



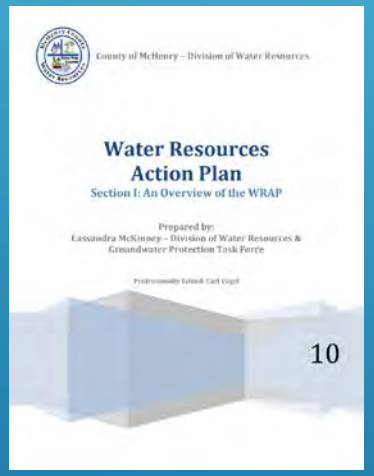
It's not just roads we salt!

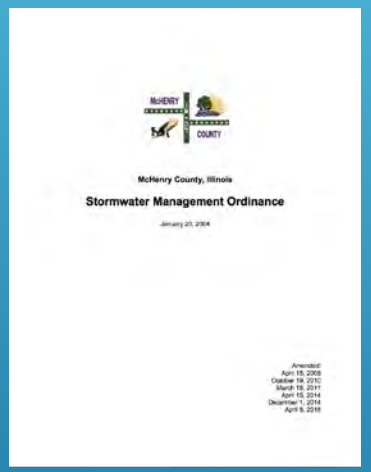
- Parking lots
- Driveways
- Sidewalks

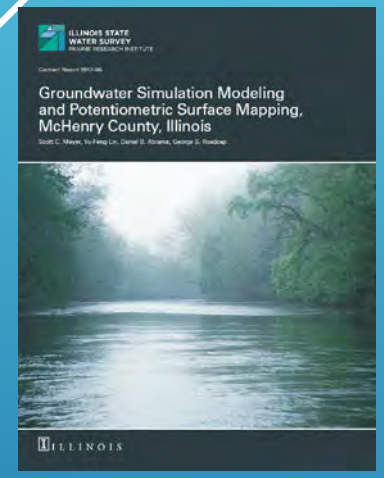
What Have We Done To Protect Water Resources?

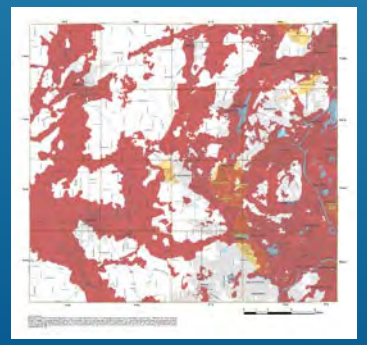
McHenry County a Leader in Protecting Water Resources

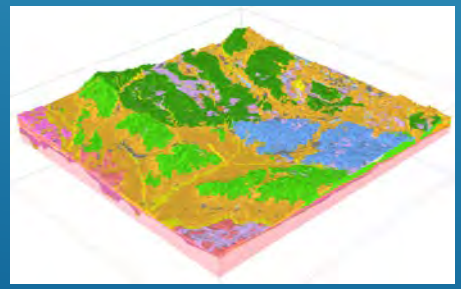
Research - Plans - Practices - Ordinances - Education - Action



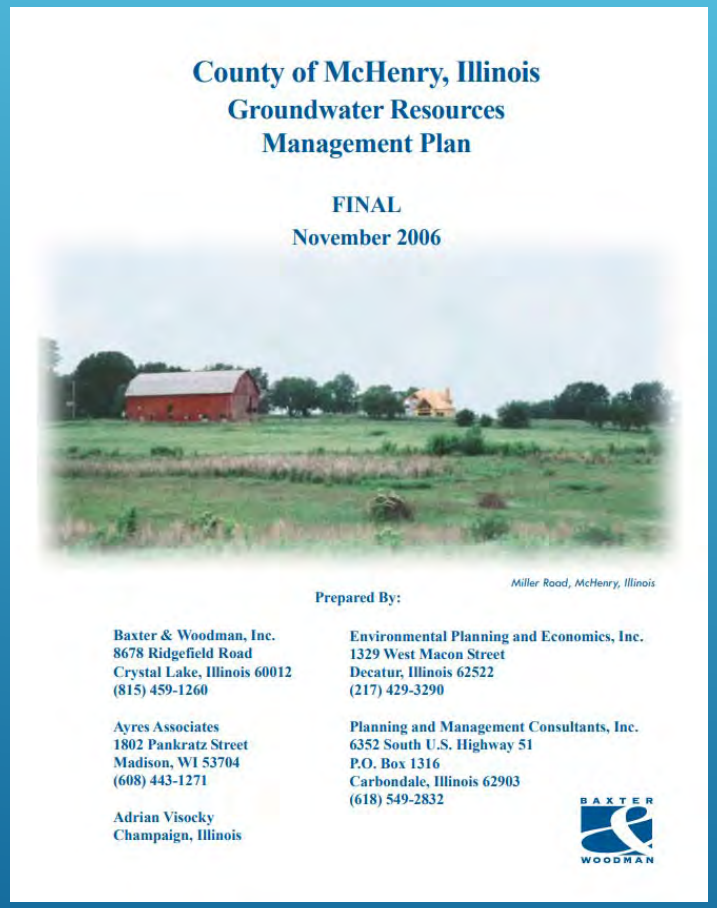








Groundwater Resources Management Plan - 2006


County of McHenry, Illinois
Groundwater Resources
Management Plan

FINAL
November 2006

Miller Road, McHenry, Illinois

Prepared By:

Baxter & Woodman, Inc.
8678 Ridgefield Road
Crystal Lake, Illinois 60012
(815) 459-1260

Environmental Planning and Economics, Inc.
1329 West Macon Street
Decatur, Illinois 62522
(217) 429-3290

Ayres Associates
1802 Pankratz Street
Madison, WI 53704
(608) 443-1271

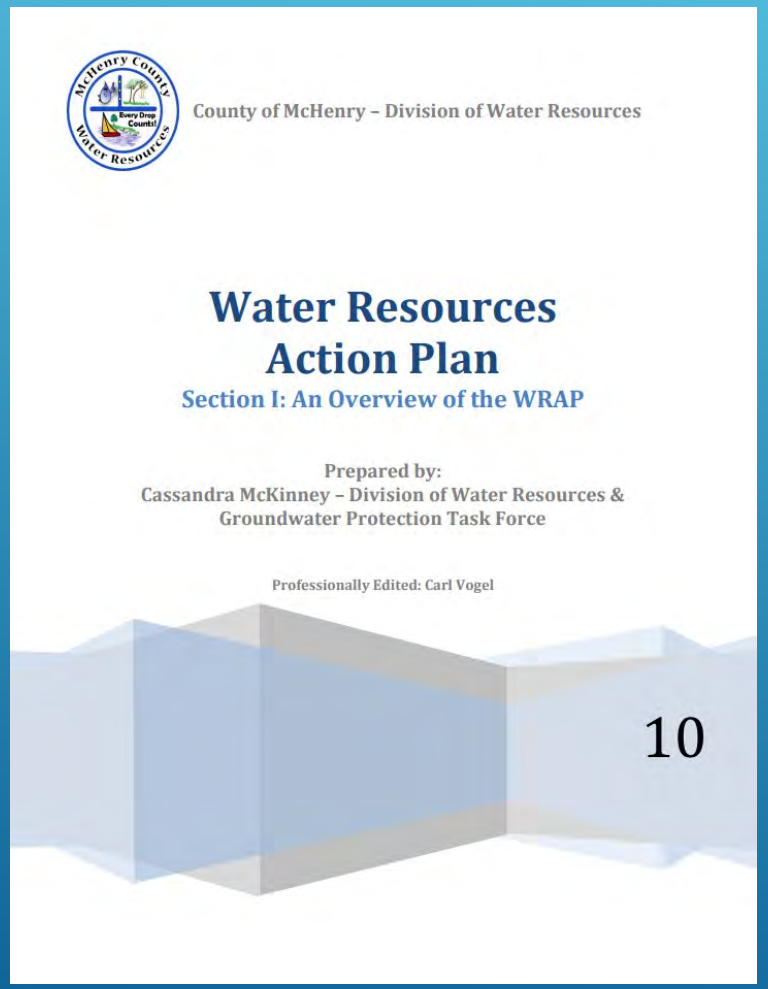
Planning and Management Consultants, Inc.
6352 South U.S. Highway 51
P.O. Box 1316
Carbondale, Illinois 62903
(618) 549-2832

Adrian Visocky
Champaign, Illinois

BAXTER & WOODMAN

- 1st Comprehensive study of County's water resources
- Evaluated water supplies and future demands
- Recognized potential for groundwater contamination
- Identified potential for aquifer depletion

Water Resources Action Plan (WRAP) - 2009



- Initiated under Direction of County Board
- Prepared by Groundwater Task Force **Volunteers (public, elected officials, municipal staff, professionals)**
- Focused on Solutions to Water Resource Issues
- Prepared 2007 to 2009 and **is due to be updated**

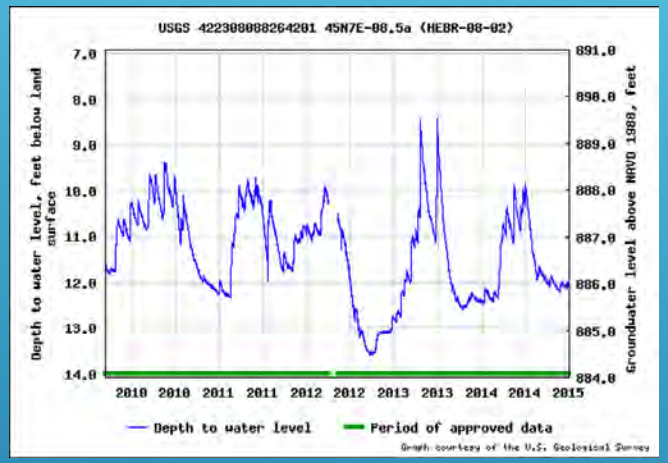
The following studies resulted from the WRAP

USGS Monitoring Well Installations (2010)

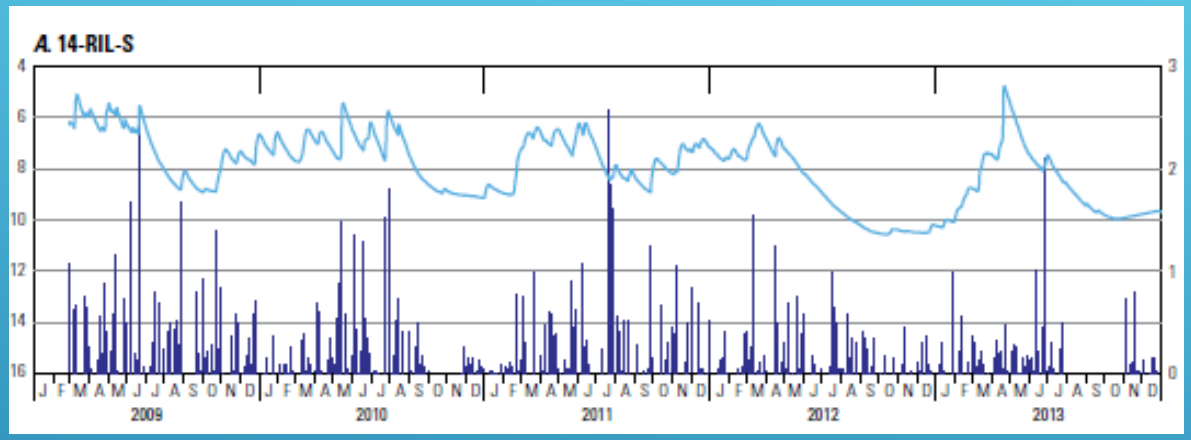
- Obtained grants from USGS/USACE
- Installed network of groundwater monitoring wells (37)
- Streamgages on Fox river, Kishwaukee River, Nippersink Creek, and Franklinville Creek
- Water depth and streamgage data measured at 15 minute intervals and transmitted via satellite
- Data is Publicly Available

USGS Monitoring Wells – Uses of Data

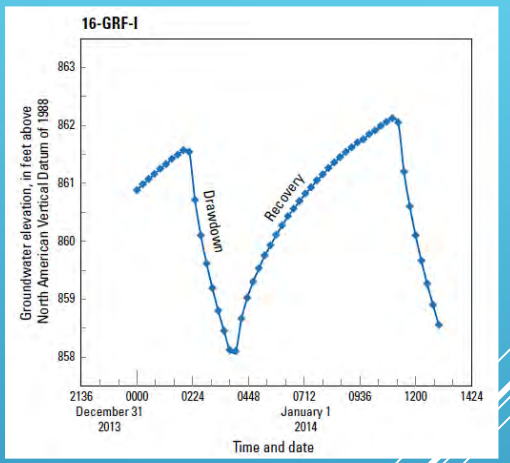
Groundwater Levels



Water Recharge/Discharge Areas

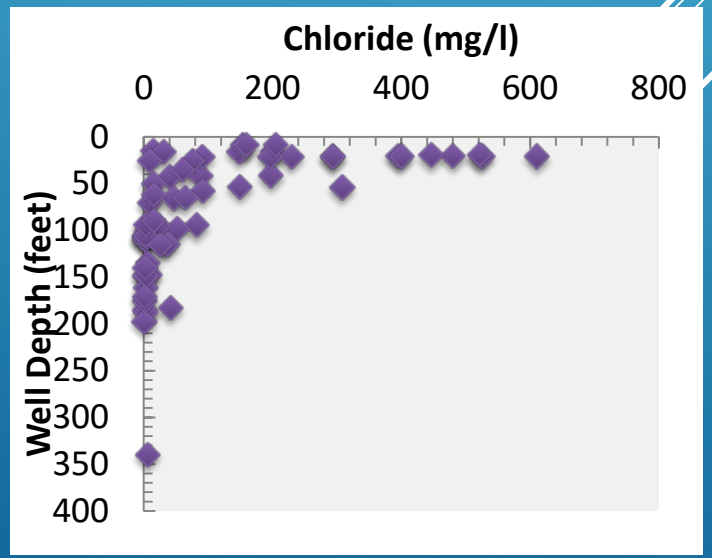


Pumping influences

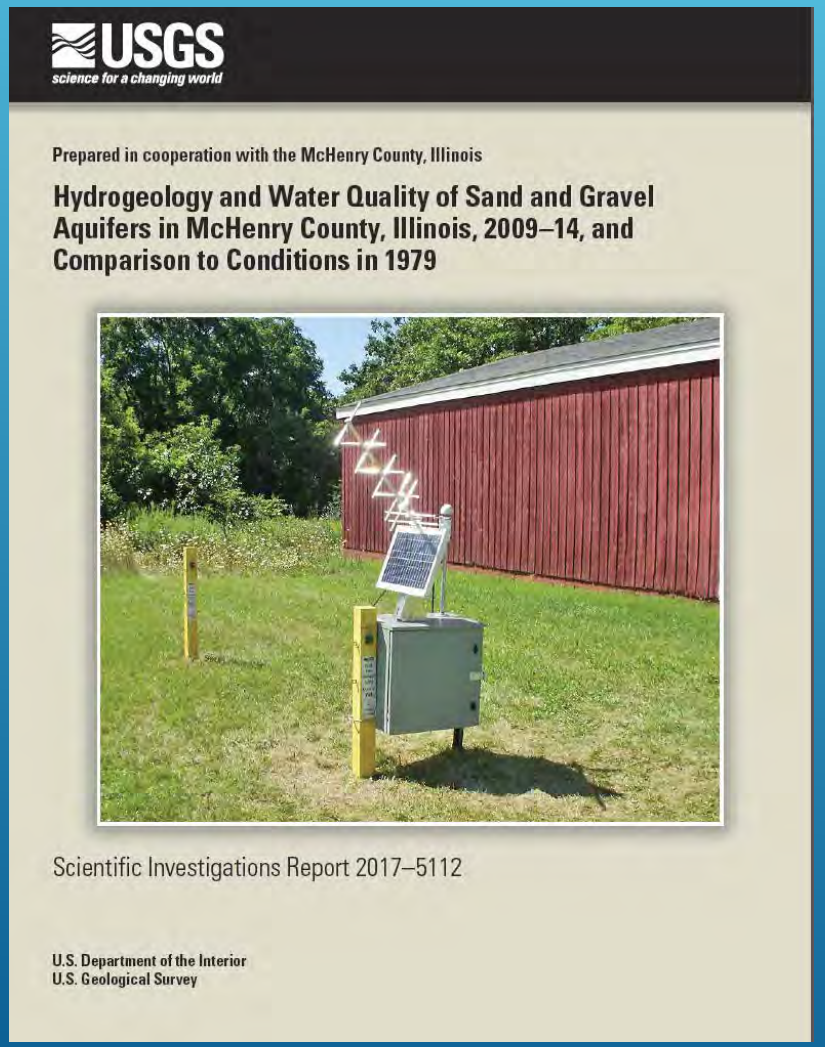


Drought Planning

Water Quality

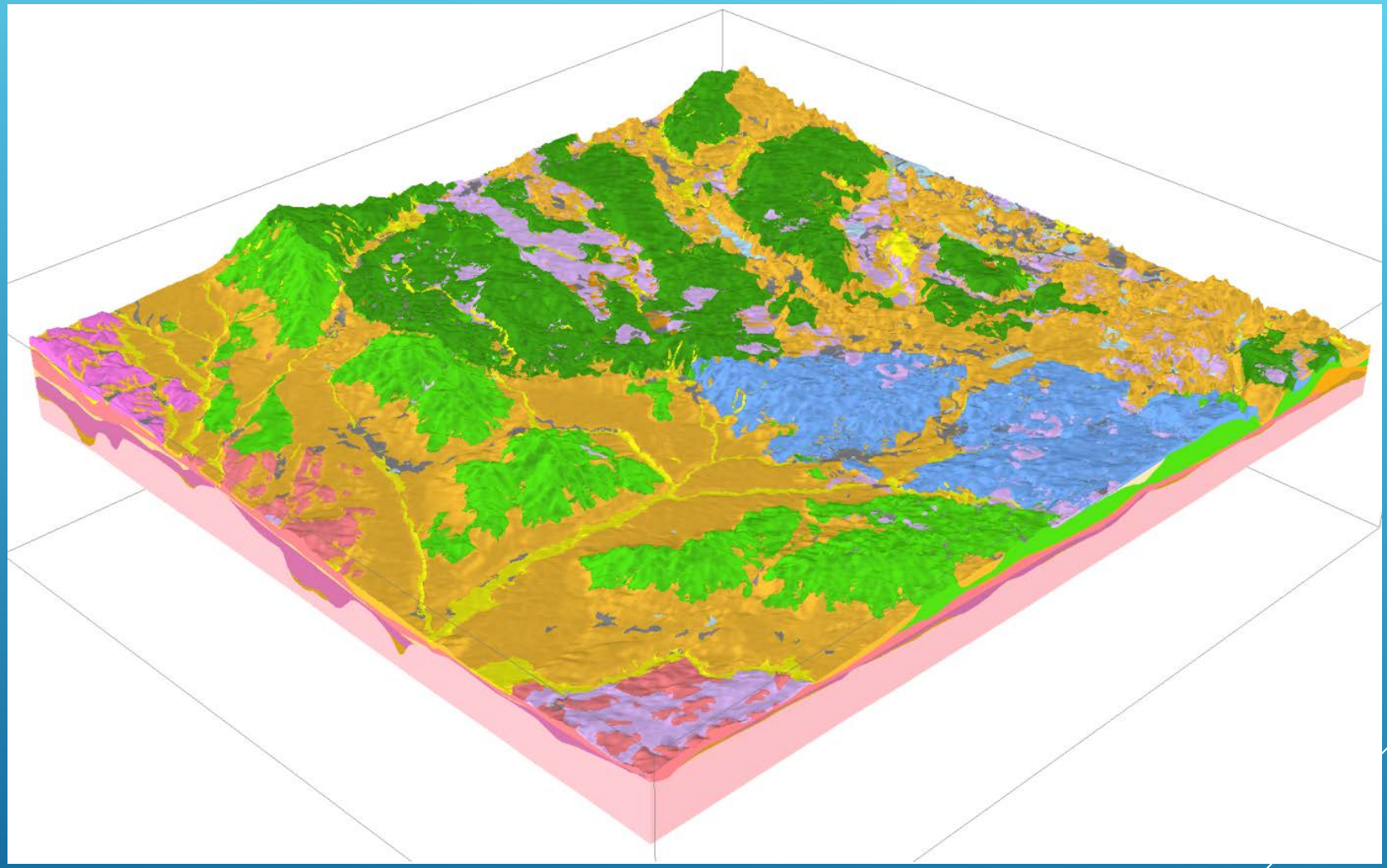


USGS Water Quality Report (2017)



- Conducted water quality testing in 2010
- **Established baseline conditions for comparison with future studies**
- Recent report summarized water quality findings of 2010 study
- Provided comparison with conditions observed in an earlier 1979 study

3D Geologic Mapping for McHenry County



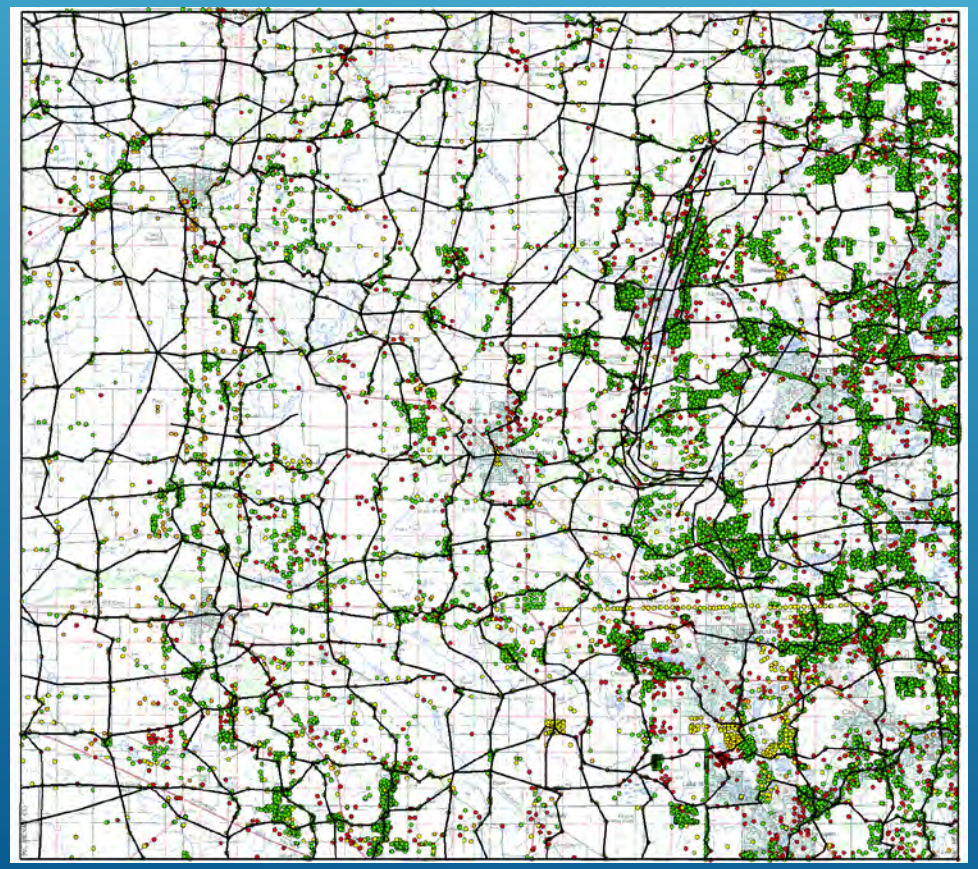
ILLINOIS STATE GEOLOGICAL SURVEY
PRAIRIE RESEARCH INSTITUTE

Jason F. Thomason and Don A. Keefer
Illinois State Geological Survey

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Data Acquisition

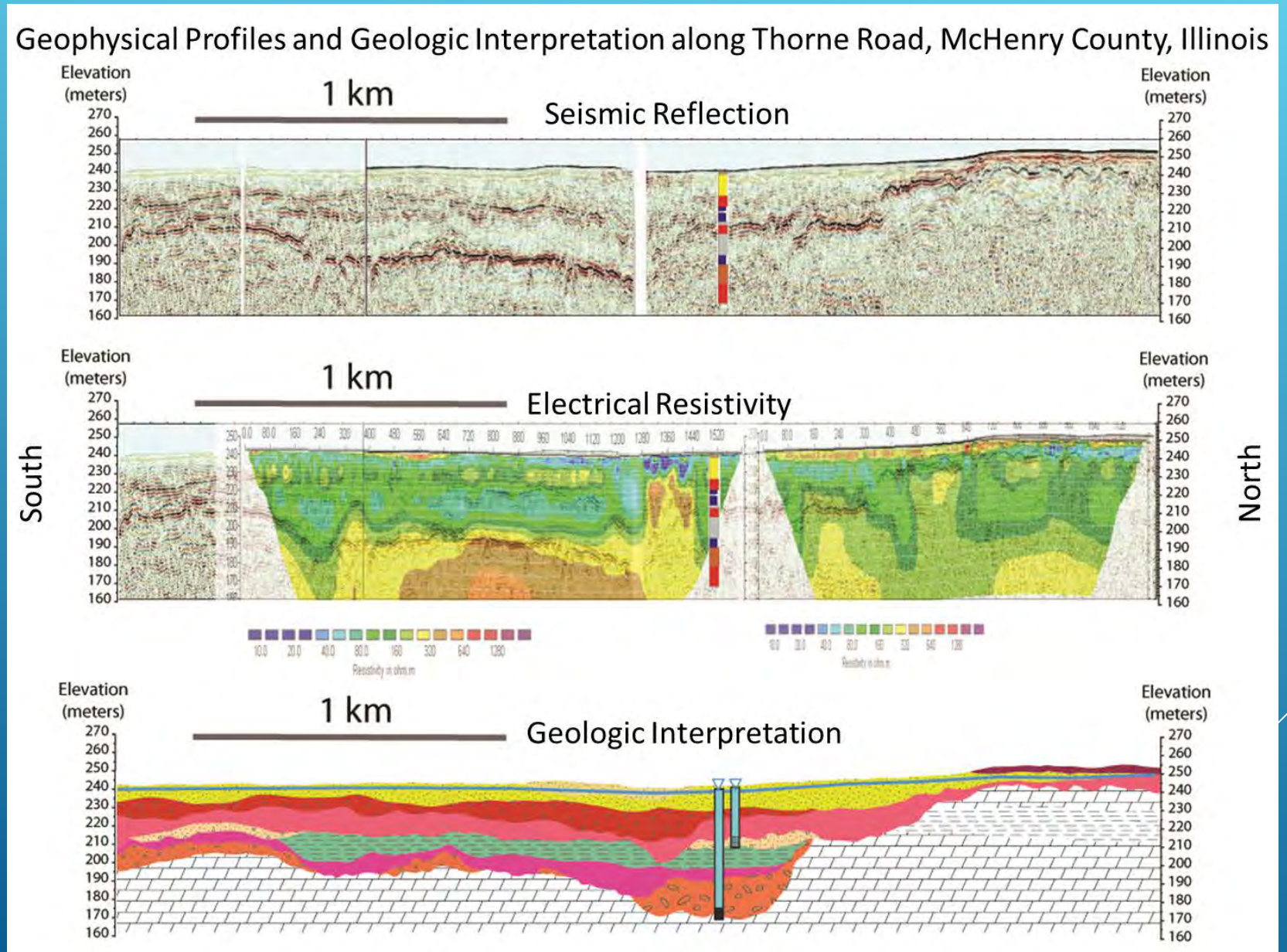
* Reviewed over 11,000 Well Logs,
* Installed new wells,
* Key cross section every ~1-2 miles



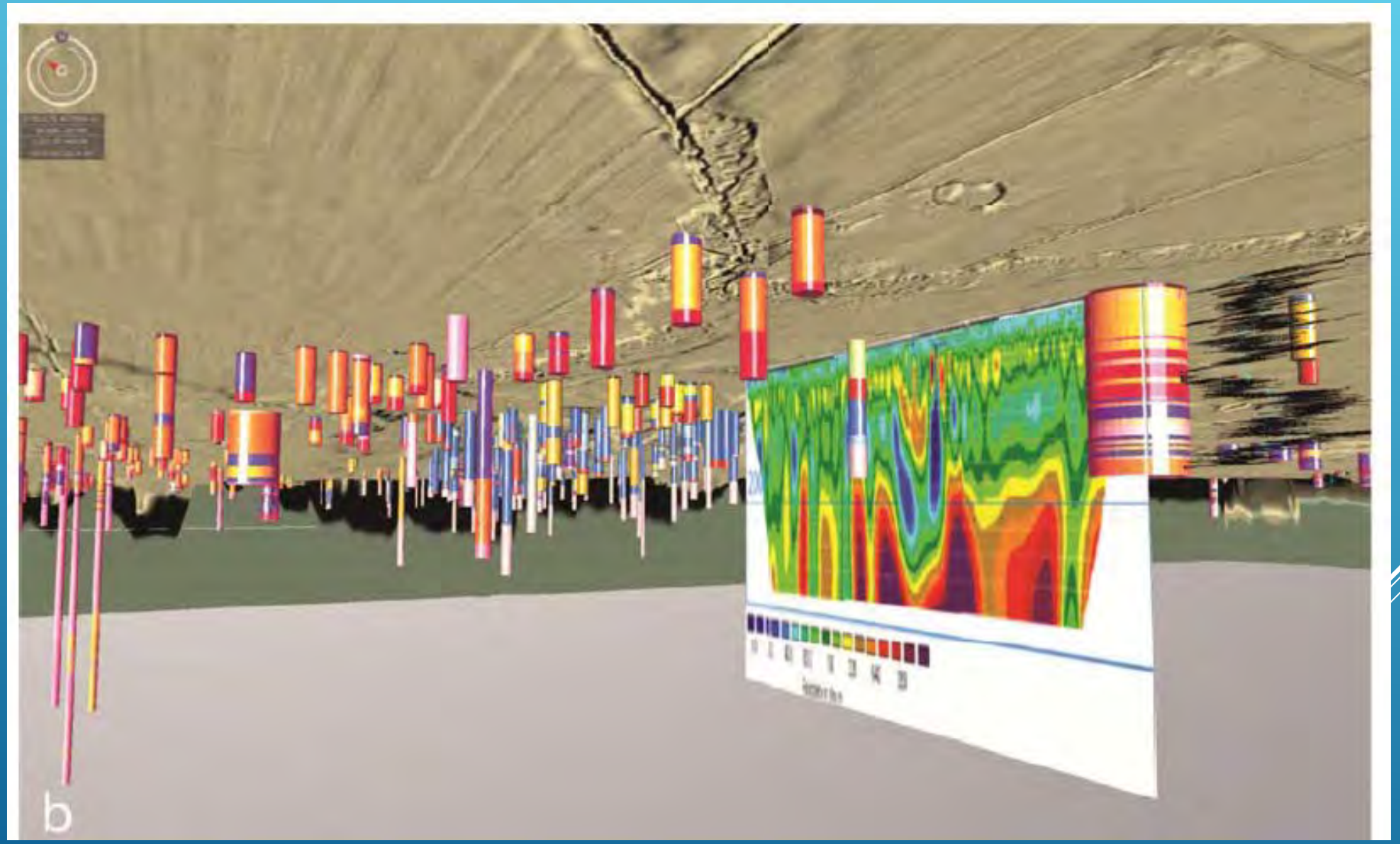
Seismic Surveys

Electrical Surveys

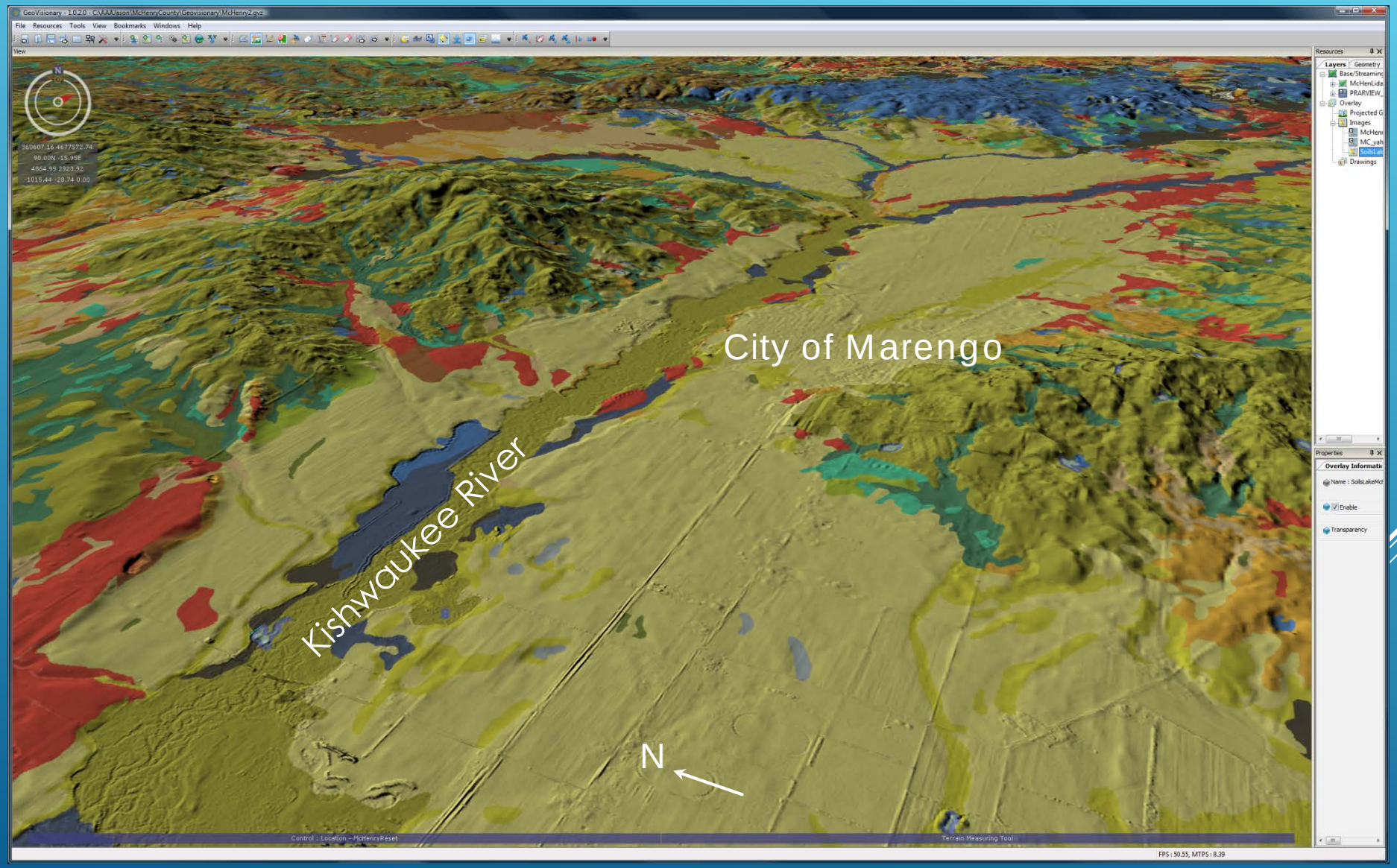
Data Provided Sub-Surface Imaging



3D Visualization of Subsurface Data

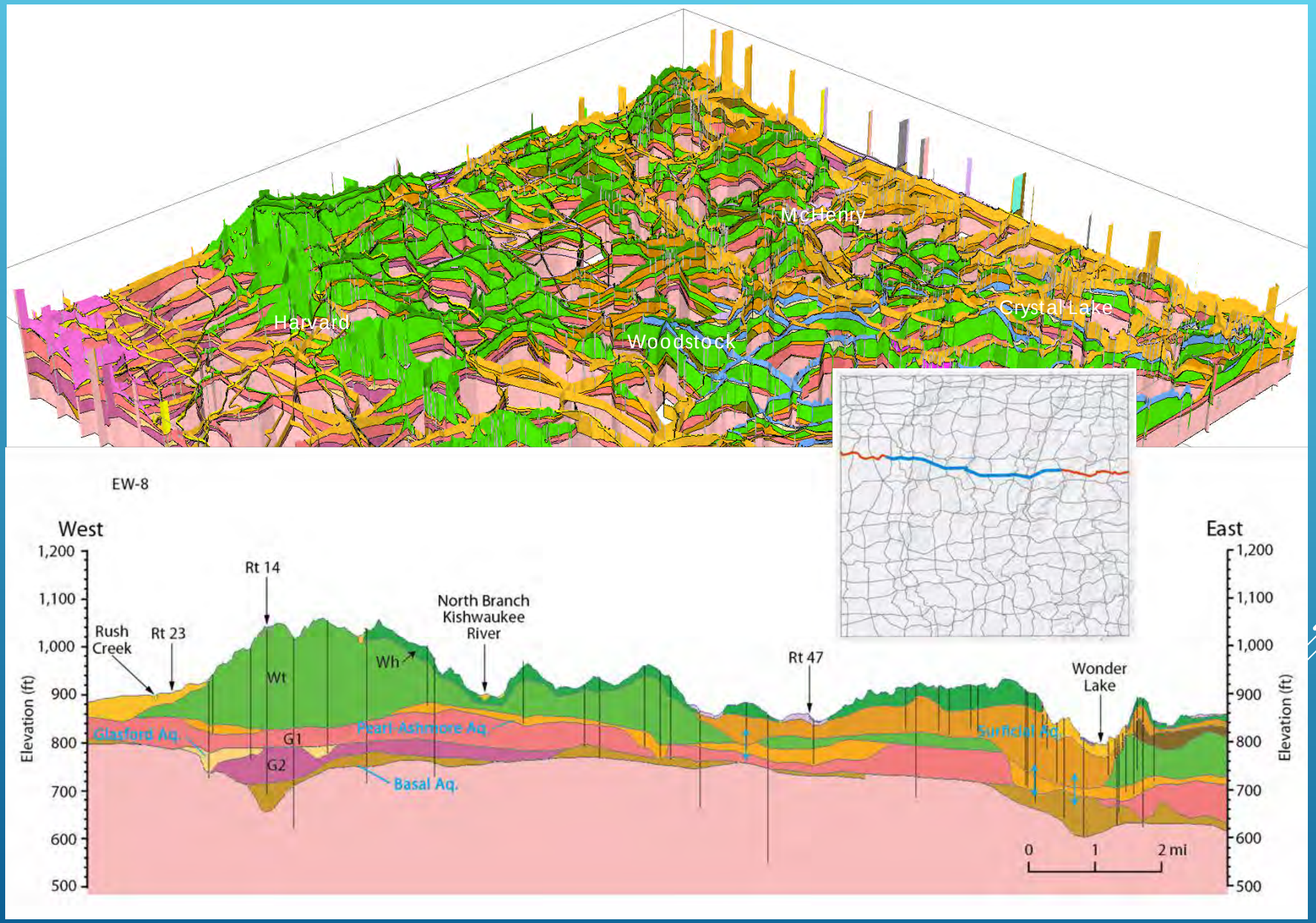


3D Visualization of Land Surface Topography and Data

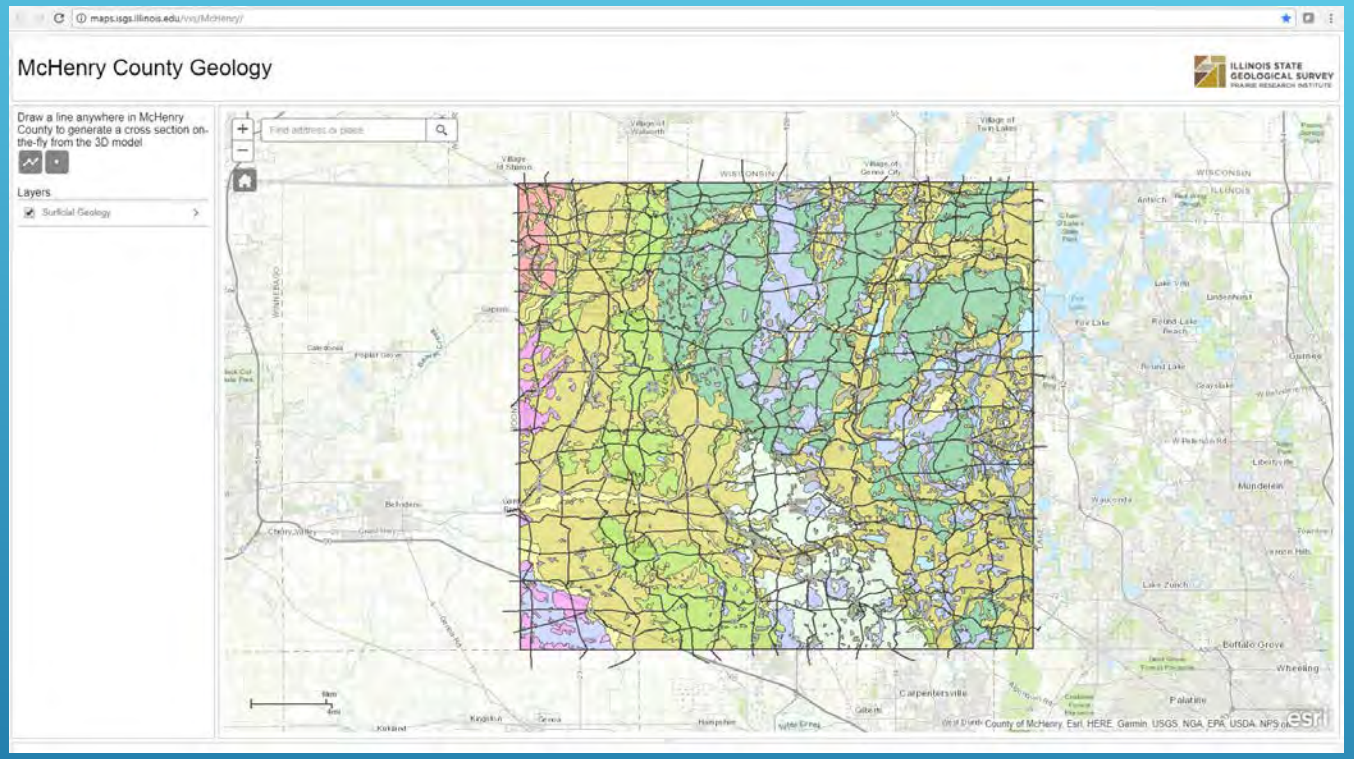


3D Geologic Map-Cross Section Network

Viewed from Southwest

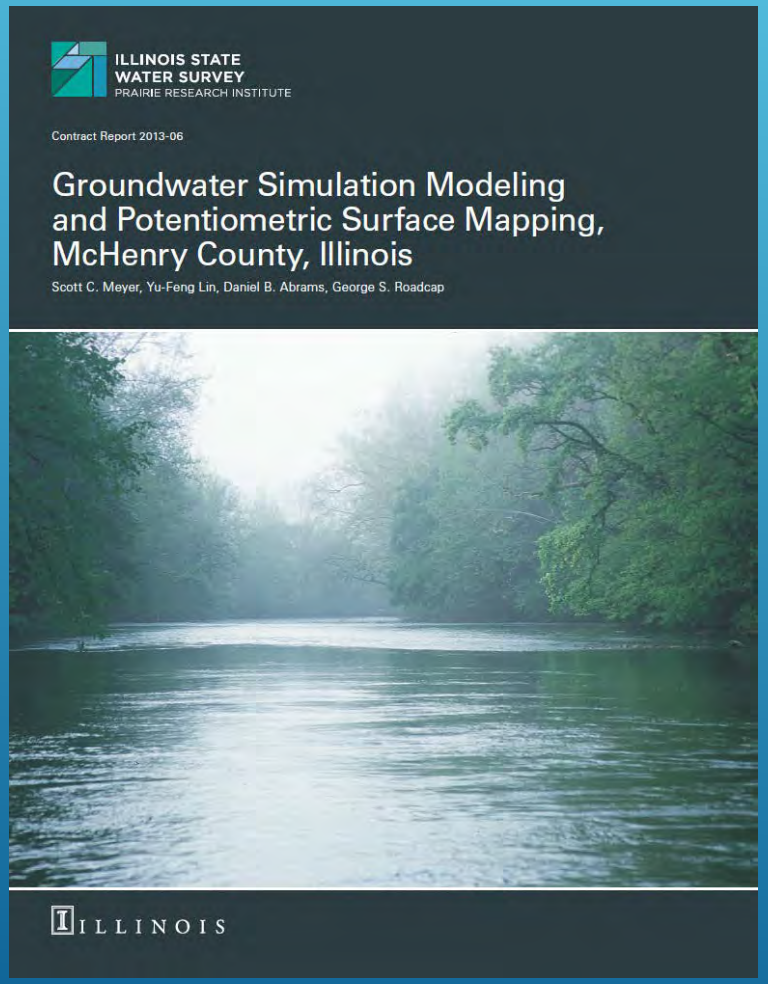


Interactive 3D Geologic Map



http://maps.isgs.illinois.edu/vxs/McHenry/

Illinois State Water Survey Modeling & Mapping



Potentiometric Surface Mapping

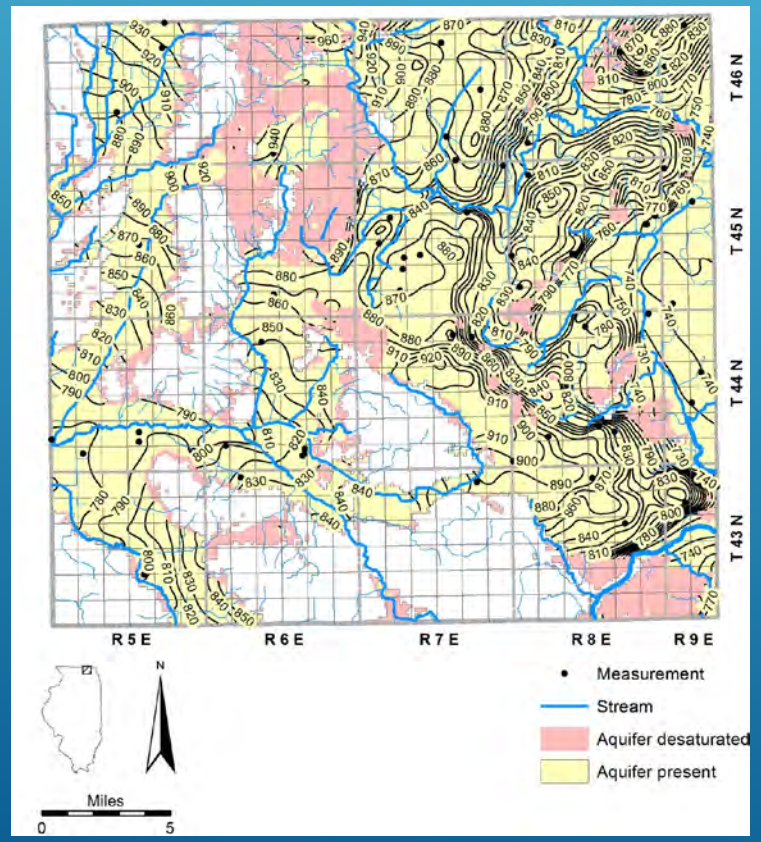
- Mapped elevation and head pressure in shallow and deep aquifers
- Changes in water levels
- Direction of groundwater flow

Groundwater Simulation Modeling

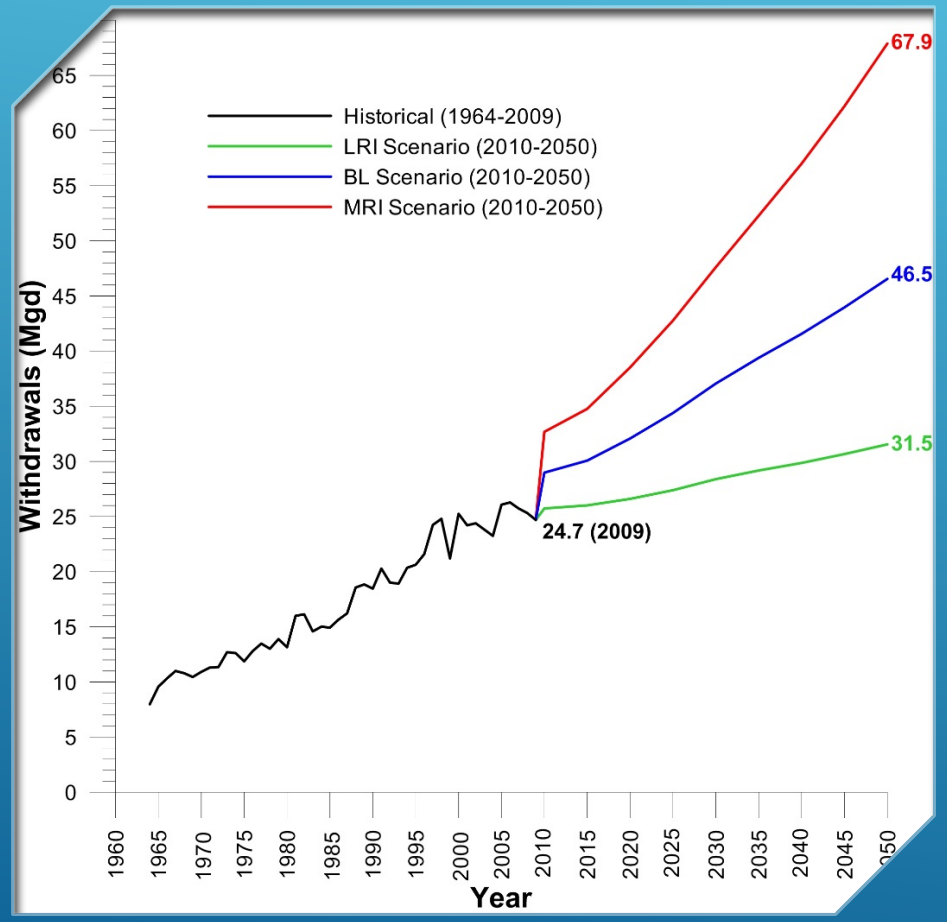
- Able to simulate aquifer drawdown
- Run scenarios based on varying conditions

Illinois State Water Survey Modeling & Mapping

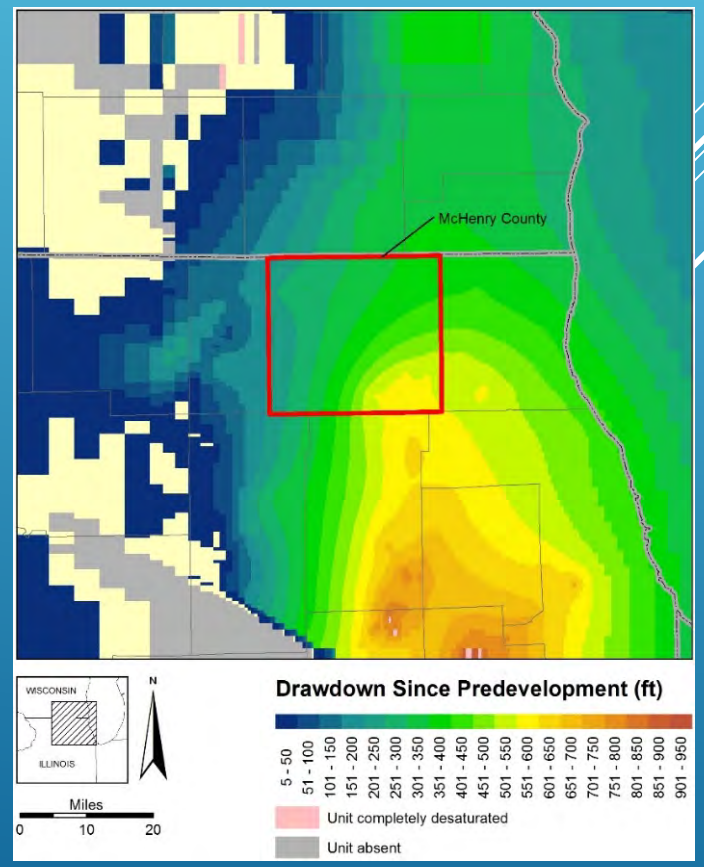
POTENTIOMETRIC MAPS



SIMULATED PUMPING SCENARIOS

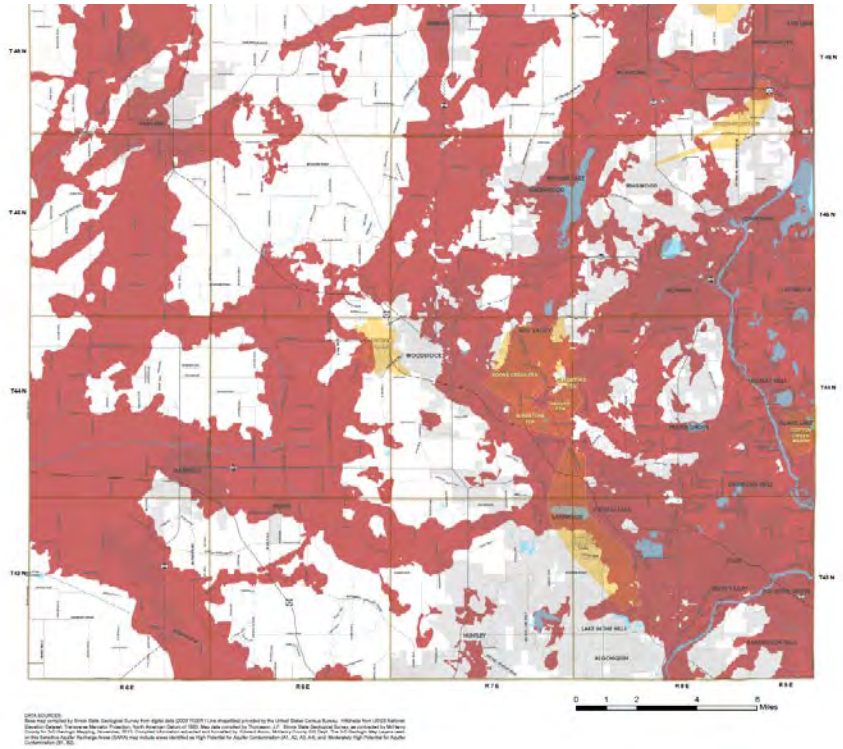


SIMULATION MODELING MAPS



Sensitive Aquifer Recharge Areas (SARA) Map - 2018

REVISED McHenry County
SARA Map



- Mapped soils with the greatest potential for aquifer recharge…and contamination
- Based on 3-Dimensional Geologic Mapping
- Connects Land Surface/Groundwater Aquifers
- Adopted into updated Unified Development Ordinance with added protection for recharge areas

Sensible Salting

McHenry County DOT has been a National Leader in developing & implementing **Sensible Salting** Practices

The use of Best Management Practices for snow and ice management to maintain safety for pedestrians, drivers, vehicles and property while minimizing the unnecessary use of salt to reduce impacts to water and the environment.

Sensible Salting Workshops

- McHenry County has held Snow & Ice Workshops for 10 Consecutive Years

- ~ *Trained and Certified over 850 People from:*
  - Municipalities
  - Townships
  - Private Operators
  - County Operators
  - Schools
  - Distributors
  - Facility Managers
  - Business Owners

Questions

About Water Resources Covered So Far?

Water Resources Action Plan (WRAP)

Update

*** WRAP Update ***

- **Develop the WRAP as a Best Management Practice Manual**
- **Design it to be functional and polished**
- **Instruct stakeholders to use the water resource tools available**
- **Identify future water resources studies that are needed**
- **Raise awareness of water resources to support protection**

INTRODUCTION

History of Water Resource Planning in McHenry County

McHenry County

- Demographics
- Geology
- Land Cover
- Climate
- Environment
- Watersheds

Land Uses

- Residential
- Commercial
- Transportation
- Agricultural
- Natural Areas/Open Space

WATER RESOURCES

General Hydrology

- Hydrologic Cycle
- Surface Water
- Groundwater
- Natural vs Urbanized Hydrology

General Water

- Biology
- Health
- Ecology/Environment
- Economy
- Threats (Contamination, Over-Use, Drought)
- Regulation (Federal, State, Local)
- Total Maximum Daily Load (TMDL)
- **One Water Concept**

McHenry County Surface Water

Lakes, rivers, streams, wetlands

Watersheds

Stormwater

Floodplain

Water Quality

Water Quantity

Plans, Studies, Reports, Ordinances

McHenry County Ground Water

3 main types of drinking water aquifers

- Shallow Aquifer – Sand and Gravel
- Shallow Bedrock – Limestone
- Deep Bedrock – Sandstone (2 main aquifers)
  - St. Peters Sandstone (upper)
  - Ironton Galesville Sandstone (lower)

Water Quality

Water Quantity

Supply and Demand

Scientific Studies and Technical Resources

MAJOR WATER ISSUES AND BEST MANAGEMENT PRACTICES

Climate Change

Water Infrastructure

- Drinking Water
- Waste Water
- Storm Water
- Water Reuse

Water Conservation

- Municipal
- Commercial/Business
- Residential

Flooding

Drought Planning

LAND USES AFFECTING WATER AND BEST MANAGEMENT PRACTICES

Residential/Small Business Development

Industrial/Heavy Commercial Development

Transportation

Gravel Pits

Agriculture

Golf Courses

Natural Areas/Open Space

Recreation And Health

LAND USES AFFECTING WATER AND BEST MANAGEMENT PRACTICES

Miscellaneous

Coal Tar Sealants

Lawn-Chemicals

Auto Salvage Yards

Improperly Abandoned Wells

Aboveground and underground Storage Tanks

Abandoned Landfills

Fly Dumping

EXAMPLES OF BEST MANAGEMENT PRACTICES

WATER CONSERVATION

Change Fixtures

- Use Watersense Products

Change Behavior

- Don’t Leave Water Running
- Take Shorter Showers
- Only Water Lawns/Plants in Morning or Evening
- Outdoor Water Use Restrictions

Change Demand

- Landscape w/Native Plants
- Convert Turf to Native
- Raingarden
- Let Lawns go Dormant

WATER PROTECTION

Don’t Pollute

- Anything we put in the air, on the land, or in the ground can pollute water

Properly dispose of Medicine

- Don’t Flush Down Toilet/Sink
- Don’t Dispose in Trash

- Do Dispose at Take-Back Collection Sites or Events

Properly Dispose of Household Materials

- Dispose at Take-Back Collection Sites or Events
- Dry Paint on Cardboard then Dispose with Regular Waste

WATER PROTECTION

Education

- Require embedded message on new storm sewers
- Retrofit existing storm sewers

Develop Watershed Management Plans

- Actively participate in their development
- Implement recommendations
- Track and share progress

Waterway Clean Up

- Support Clean-Up days and other activities to restore waterways and raise awareness

RESIDENTIAL DEVELOPMENT BMP'S

*** PROMOTE NATURAL HYDROLOGY ***

Raingardens

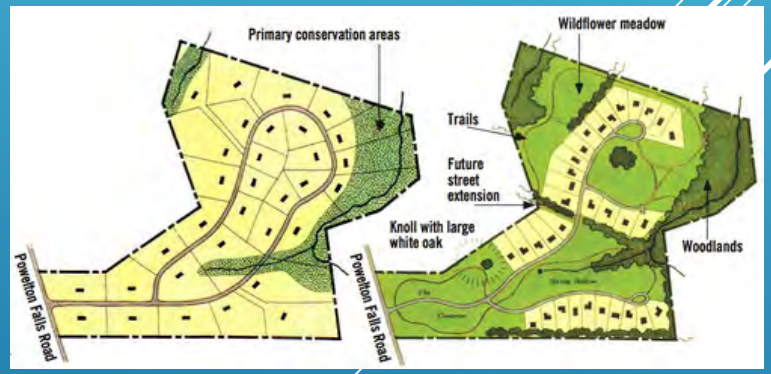
- Promote infiltration
- Treat water as an asset

Naturalized Detention

Control flooding plus:

- Stabilize Shoreline
- Improve water quality
- Create natural beauty
- Provide wildlife habitat

Conservation Design



- Reduce footprint and impervious surfaces

LIGHT COMMERCIAL DEVELOPMENT BMP'S

*** PROMOTE NATURAL HYDROLOGY ***

Bio-Swales

Provides conveyance plus

- Promotes infiltration
- Improves water quality
- Flood storage
- Aesthetic beauty
- Provide wildlife habitat

Naturalized Detention

- Control flooding
- Improve water quality
- Create natural beauty
- Provide wildlife habitat

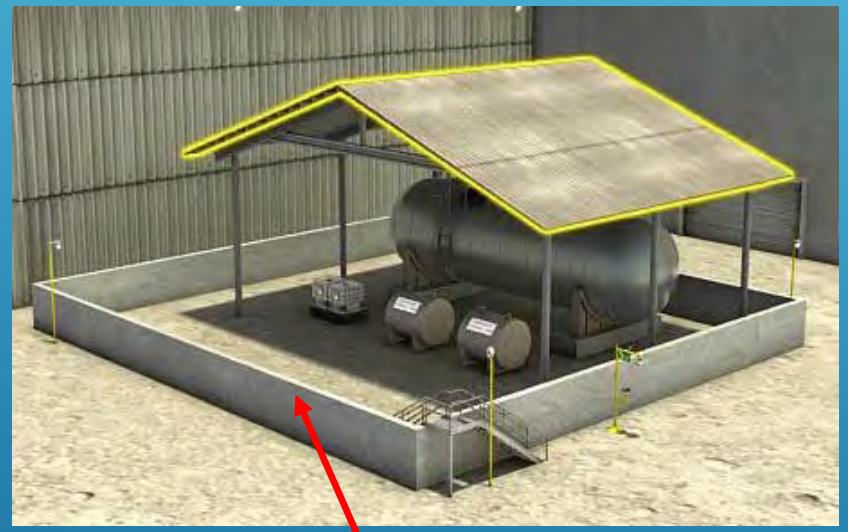
Permeable Paving

- Promote infiltration
- Water quality treatment
- Flood storage

INDUSTRIAL DEVELOPMENT BMP'S

*** FOCUS - CONTAINMENT, CLEAN UP, CONTACT AVOIDANCE ***

Cover to Prevent Contact

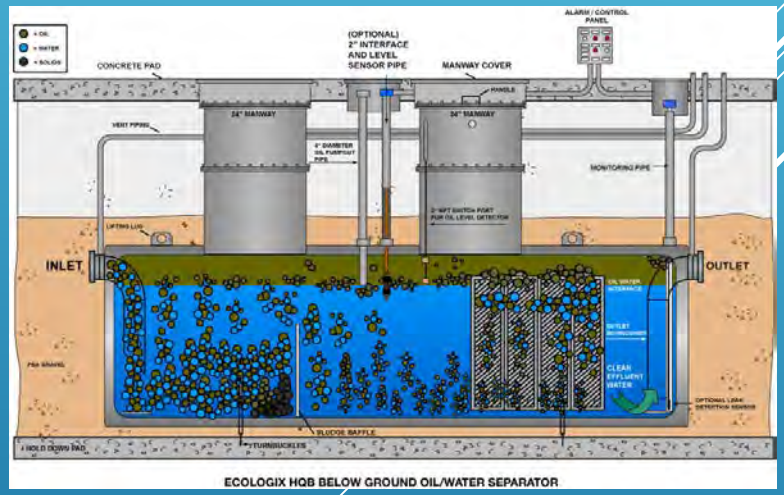


Provide Secondary Containment

Good Housekeeping

Spill Prevention and Clean-Up

Technological Controls



- Oil/Grit Separators
- Double Walled Tanks
- Alarm Systems
- Monitoring Wells

TRANSPORTATION - SENSIBLE SALTING

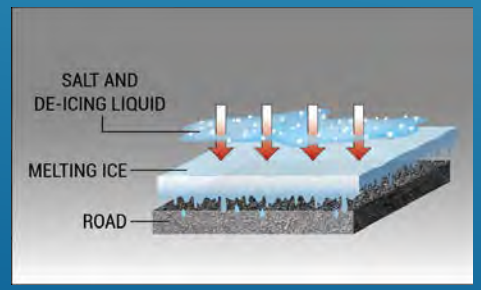
Cover and Contain

- Location
- Location
- Location

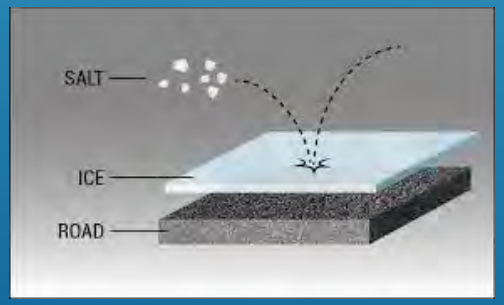
Calibrate Equipment

- Can’t manage if you don’t measure
- Control Application Rate

Pre-Wet Salt



- Activates Salt



- Reduces Bounce

Anti-Icing

- Apply Liquids Before Storm
- Prevents Ice Formation
- Simplifies Snow Removal
- Less Repeat Applications

AGRICULTURE

PREVENT NUTRIENT LOSS AND SOIL EROSION

No Till Farming

- Reduces soil loss
- Reduces phosphorous

Grassed Waterways

- Reduces erosion
- Slows runoff
- Improves water quality

Bio-Reactor

- Direct tile flow through woodchips
- Converts nitrate to nitrogen gas

NATURAL AREAS AND OPEN SPACE

Support the Protection, Restoration and Enhancement of Natural Habitat to Improve Resilience and Ecosystem Services

Natural Areas

Passive Open Space

Parks

OTHER LAND USES

Golf Courses

- Native plants
- Reduced fertilizer and irrigation

Gravel Pits

- Groundwater monitoring
- Restoration plans
- Pollution prevention
- Spill clean up

Recreation

- Location and access
- Public health and safety
- Education and economy

MISCELLANEOUS

Coal Tar Sealants

Poly Aromatic Hydrocarbon (PAH)

Weathered Asphalt	4 mg/kg
Used Oil	440 mg/kg
Coal Tar Sealant	70,000 mg/kg

- Use acrylic or asphalt sealants

Fly Dumping

- Pollution prevention
- Reporting Procedures
- Clean up process

Salvage/Scrap Yard

- Housekeeping
- Material recovery/storage
- Groundwater monitoring

FLOODING

Mitigation/Adaptation Strategies

Flooding & Water Quality

2019 Water Forum Theme is “Flooding”

WATER RECOURCES EDUCATION

Promote Education and Events to Raise Awareness and Support for Water Resources

Schools

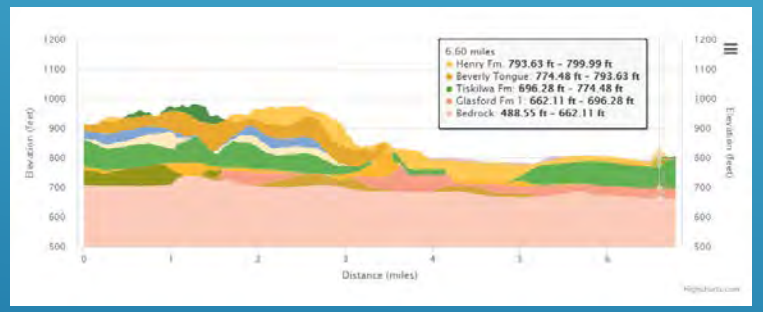
Interactive Programs

Special Events

PLANNING TOOLS

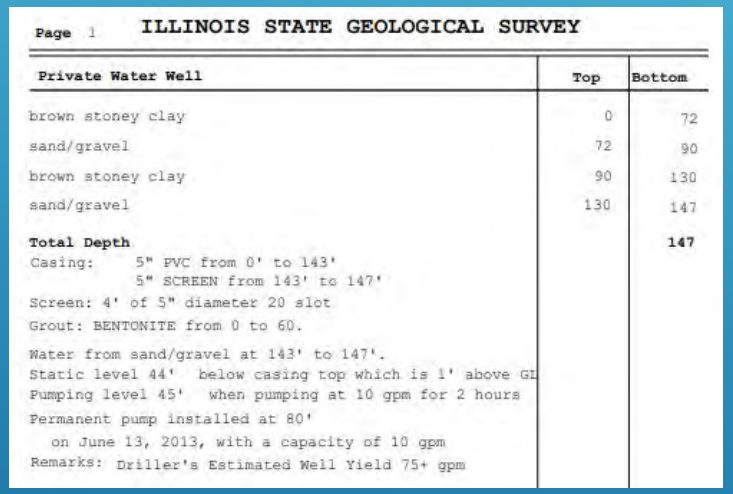
Learn To Use The Water Resource Planning Tools

3 Dimensional Mapping



- Subsurface Geology
- Groundwater Aquifers

Illinois Water & Related Wells



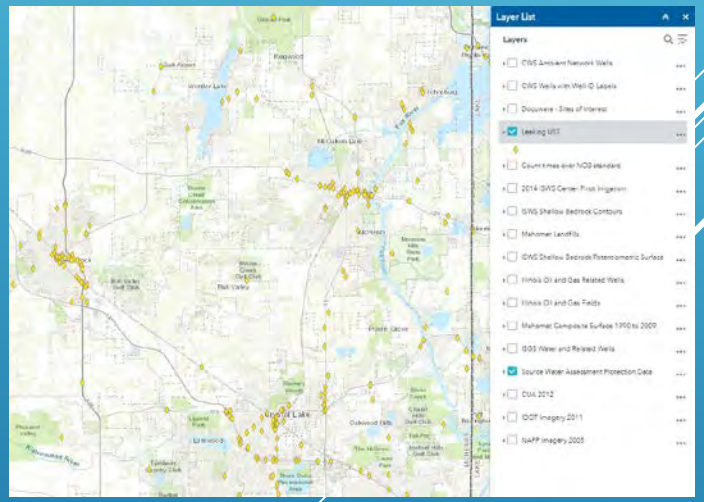
Page 1 ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
brown stoney clay	0	72
sand/gravel	72	90
brown stoney clay	90	130
sand/gravel	130	147
Total Depth		**147**

Casing: 5" PVC from 0' to 143'
5" SCREEN from 143' to 147'
Screen: 4' of 5" diameter 20 slot
Grout: BENTONITE from 0 to 60.
Water from sand/gravel at 143' to 147'.
Static level 44' below casing top which is 1' above GL
Pumping level 45' when pumping at 10 gpm for 2 hours
Permanent pump installed at 80'
on June 13, 2013, with a capacity of 10 gpm
Remarks: Driller's Estimated Well Yield 75+ gpm

- Well Logs
- Geology
- Water Depth & Volume

Source Water Assessment Program



- Sources of Contamination
- Water Quality Data
- Well Data

WRAP UPDATE WORKPLAN AND TIMELINE

- **March 2019 - Kick-Off Meeting**
- **April 2019 to March 2020 - 12 Task Force Meetings**

  Each Meeting Loosely in 3 parts

  1st third = Formal presentations on specific topics
  2nd third = Curated discussions on variety of topics
  3rd third = Review and discussion on completed drafts

- **Planning & Development: Principle Author with Input from Task Force**
- **Spring 2020 Completed WRAP for Adoption by County Board**
- **2020 – 2021 Work with Municipalities to adapt and adopt WRAP**

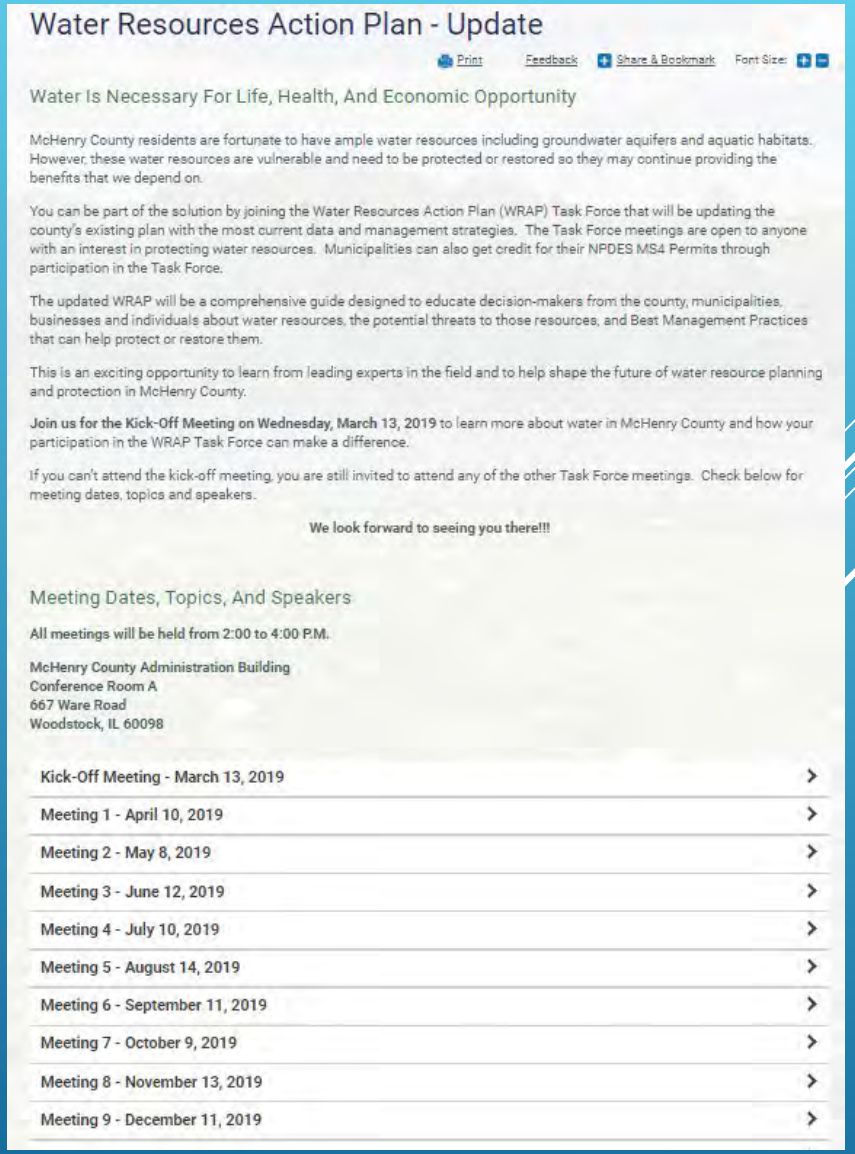
WRAP TASK FORCE MEETING SCHEDULE

Meeting Date	Presentation Topic	Speakers
March 2019 (Kick-Off)	Water Resources - WRAP Process, Scope, Timeline	Scott Kuykendall (McHenry Co)
April 10, 2019	Geology – Surface Water - Groundwater	Jason Thomason (ISGS) Ed Collins (MCCD)
May 8, 2019	Water Quantity - Water Quality	Walt Kelly (ISWS), Dan Abrams (ISWS)
June 12, 2019	Hydrogeology - Water Use - Water Quality	Amy Gahala (USGS) Bob Kay (USGS)
July 10, 2019	Pollution Prevention	Rick Cobb (IEPA) Patti Nomm (Health Dept)
August 14, 2019	Water Law – Stormwater Regulations – MS4	Gary Clark (IEPA Retired) Joanna Colletti (McHenry County) Karen Katamay (IEAP)
September 11, 2019	**Water Forum - Flooding**	Paul Osman (IDNR) Joanna Colletti (McHenry Co) Municipal Case Study
October 9, 2019	Best Management Practices (residential/commercial/Industrial)	
November 13, 2019	Water Conservation	Mary Anne Dickenson (AWE) Susan Reinking (Pepper Const.)
December 11, 2019	Transportation	Earnest Varga (MCDOT) Scott Kuykendall (McHenry Co)
January 8, 2020	Agriculture	
February 12, 2020	WRAP Plan Review	
March 11, 2020	WRAP Plan Review	

WRAP WEBSITE AND E-MAIL

mchenryh2o.com

wrap@mchenrycountyil.gov



Water Resources Action Plan - Update

Print Feedback Share & Bookmark Font Size:

Water Is Necessary For Life, Health, And Economic Opportunity

McHenry County residents are fortunate to have ample water resources including groundwater aquifers and aquatic habitats. However, these water resources are vulnerable and need to be protected or restored so they may continue providing the benefits that we depend on.

You can be part of the solution by joining the Water Resources Action Plan (WRAP) Task Force that will be updating the county's existing plan with the most current data and management strategies. The Task Force meetings are open to anyone with an interest in protecting water resources. Municipalities can also get credit for their NPDES MS4 Permits through participation in the Task Force.

The updated WRAP will be a comprehensive guide designed to educate decision-makers from the county, municipalities, businesses and individuals about water resources, the potential threats to those resources, and Best Management Practices that can help protect or restore them.

This is an exciting opportunity to learn from leading experts in the field and to help shape the future of water resource planning and protection in McHenry County.

Join us for the Kick-Off Meeting on Wednesday, March 13, 2019 to learn more about water in McHenry County and how your participation in the WRAP Task Force can make a difference.

If you can't attend the kick-off meeting, you are still invited to attend any of the other Task Force meetings. Check below for meeting dates, topics and speakers.

We look forward to seeing you there!!!

Meeting Dates, Topics, And Speakers

All meetings will be held from 2:00 to 4:00 P.M.

McHenry County Administration Building
Conference Room A
667 Ware Road
Woodstock, IL 60098

- Kick-Off Meeting - March 13, 2019
- Meeting 1 - April 10, 2019
- Meeting 2 - May 8, 2019
- Meeting 3 - June 12, 2019
- Meeting 4 - July 10, 2019
- Meeting 5 - August 14, 2019
- Meeting 6 - September 11, 2019
- Meeting 7 - October 9, 2019
- Meeting 8 - November 13, 2019
- Meeting 9 - December 11, 2019

Scott Kuykendall

Water Resources Specialist

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