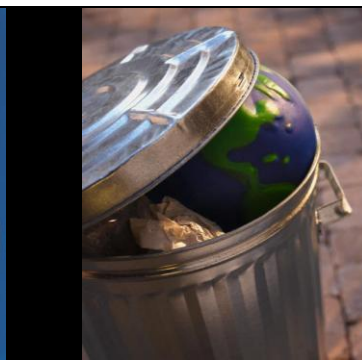
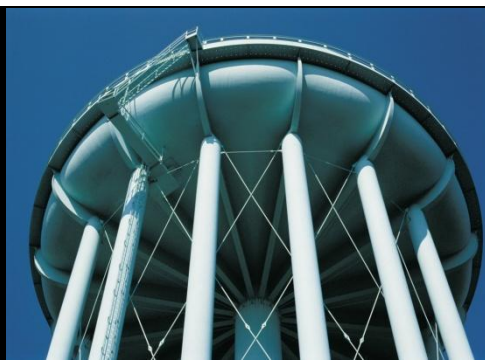


Groundwater Protection in McHenry County



Towards A Sustainable Water Supply

Cassandra McKinney
McHenry County Government



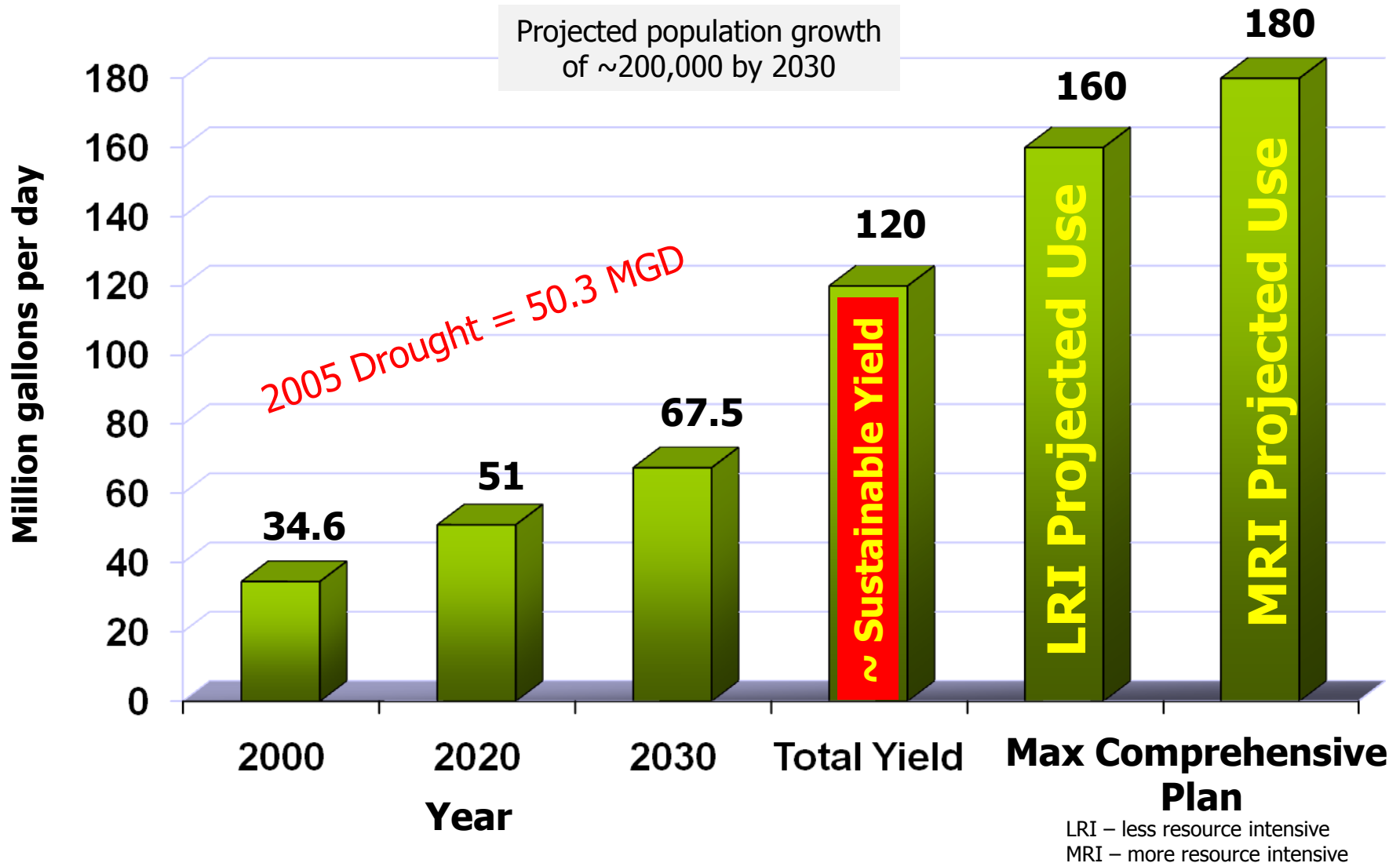


The State of Water in McHenry County, Illinois

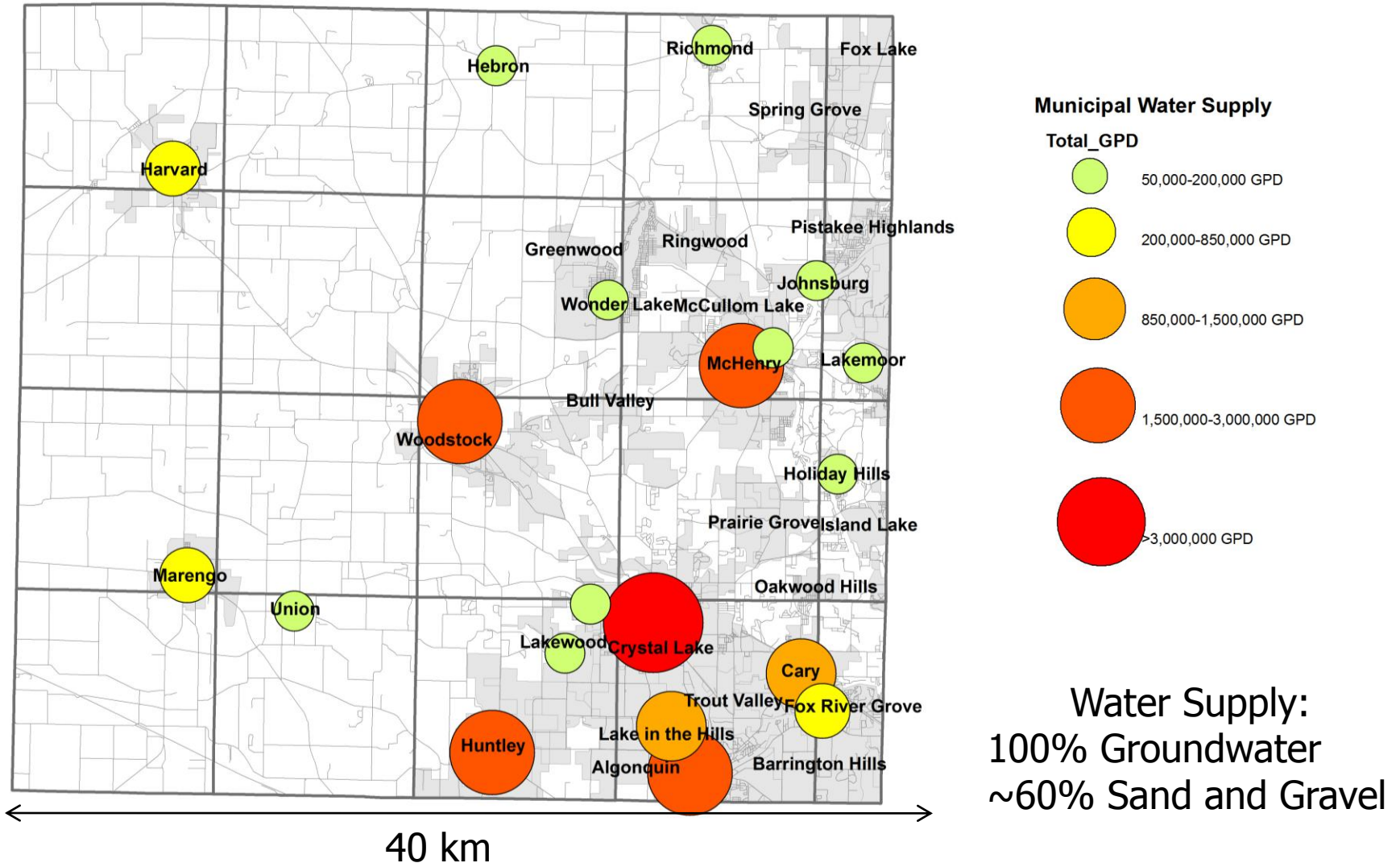
McHenry County Challenge

- McHenry County is solely dependant on groundwater for all of its potable water needs
 - Lake Michigan Water is not an option
- Adequate groundwater quantity *and* quality is essential to the present and future well being of McHenry County residents and businesses.
 - Including things like recreation, aesthetics, food production...
- The groundwater supply is:
 - Limited
 - Vulnerable to pollution

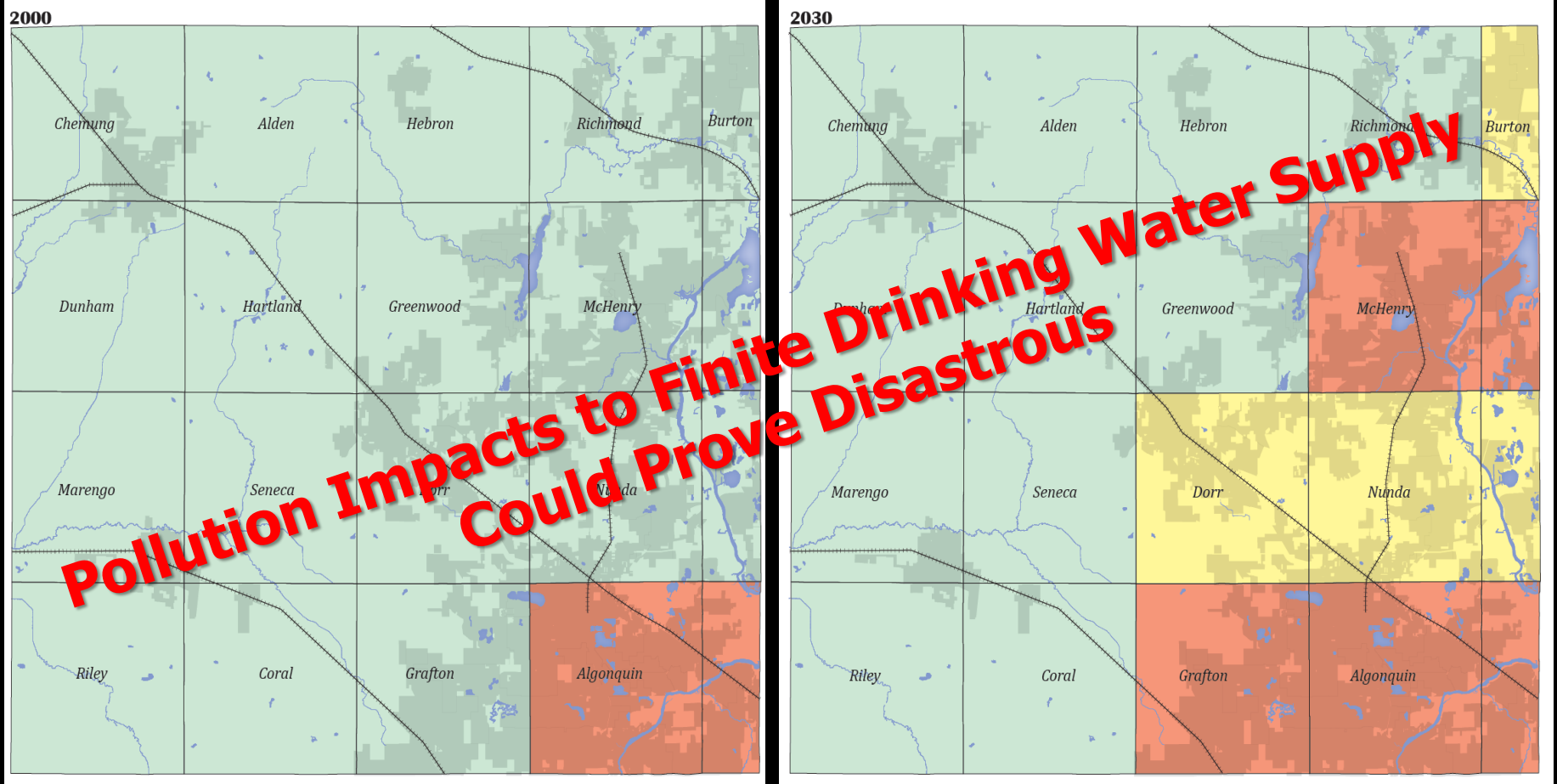
How Much Water Do We Use in McHenry County?



Municipal Water Supplies



McHenry County Water Supply Projections



Map Legend

- Townships/Areas with Surplus Groundwater Capacity (Ratio 0.0 - 0.6)
- Townships/Areas of Groundwater Concern (Ratio 0.6 - 0.8)
- Townships/Areas with Potential for Groundwater Shortage (Ratio > 0.8)
- Water Features
- Railroads
- Incorporated Municipality

The Future of a Community

Water Supply Planning

- Sound & Healthy Economy
- Healthy Environment
- Open Space & Agriculture
- High Quality of Life
- Sustainable & Safe Water Supply

Smart Growth



**What about Public Safety
and Fire Protection?**

Lack of Water Supply Planning

- Loss of Jobs, Retail & Industry
- Degraded Natural Areas & Loss of Open Space
- Loss of Agriculture
- Decreased Quality of Life
- Decreased Property Values
- Stagnation

Sprawl

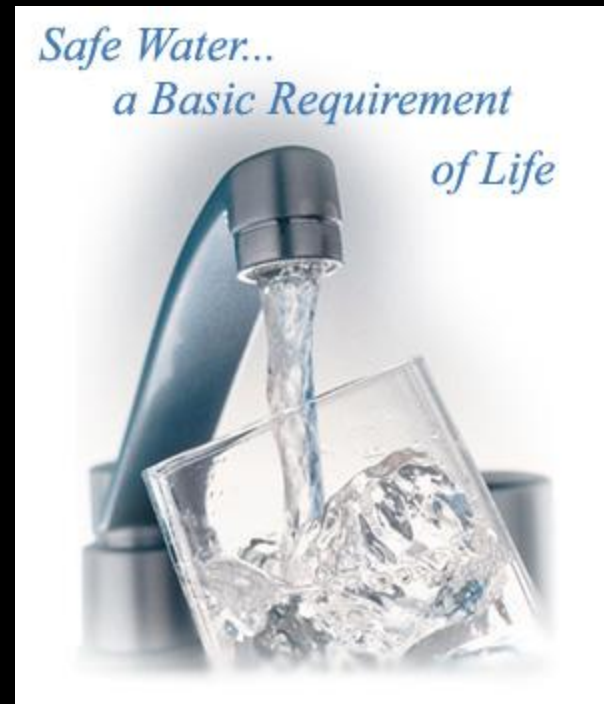
Why is it that water takes up
70% of the earth's surface and 60% of our bodies, yet
so little of our thinking?



Imagine turning water problems into
opportunities!

Opportunity:

- To rethink the way we treat and value water in McHenry County and across the Region!



Create a Program to:

Protect and preserve the
quantity and quality
of groundwater for our generation and
future generations,
including the built and natural environment.

Water Resources Action Plan:

Quality

- Pollution Prevention
- Sensible Salting

Education

Quantity

- Water Conservation
- Conservation Design

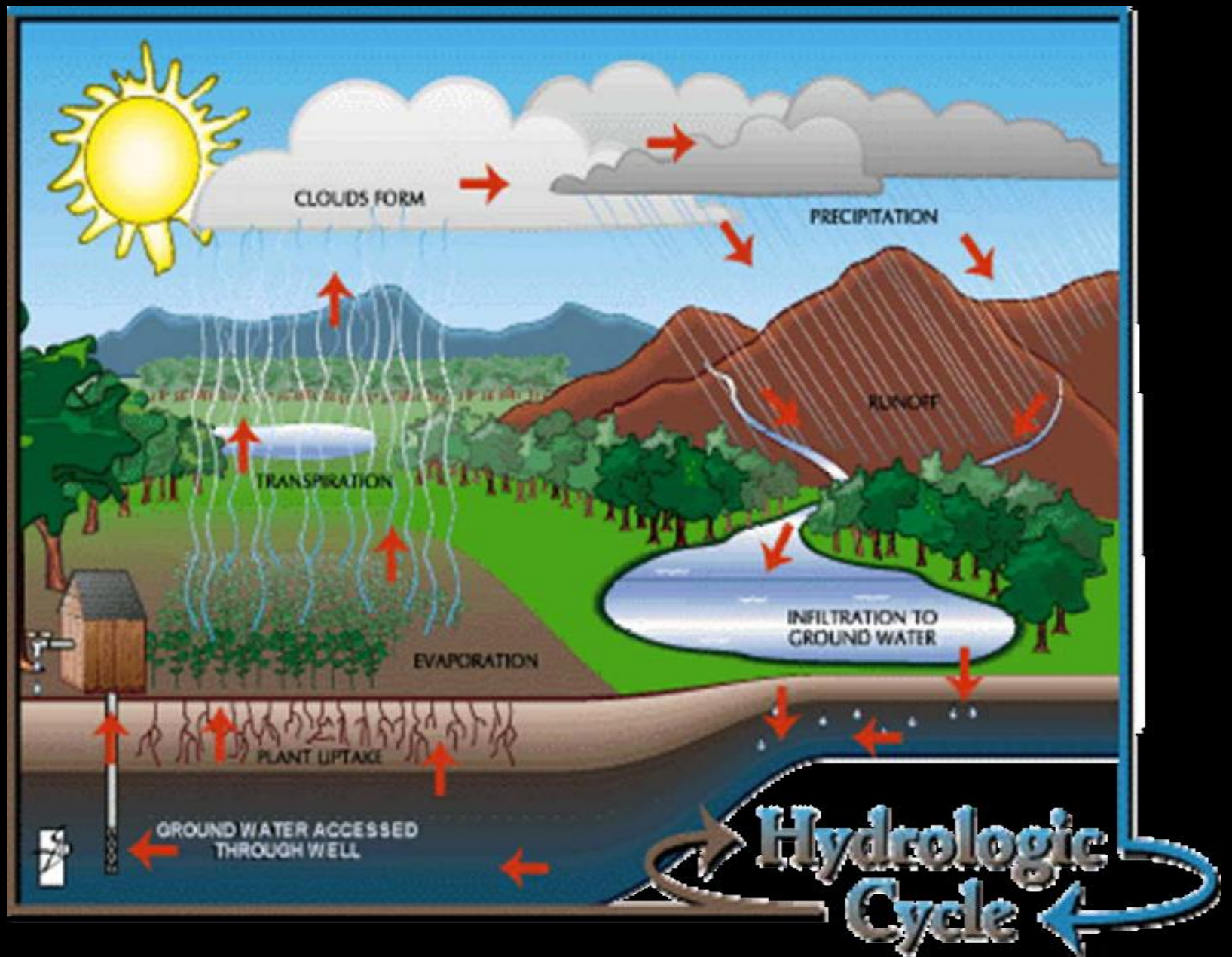
Quantity & Quality

- Groundwater Recharge
- Protection of Water Dependent Ecosystems
- Wastewater
- Water Supply Planning
 - Drought Preparedness
 - Contingency Planning

**National Pollutant Discharge
Elimination Systems
(NPDES)**

Cuyahoga River On Fire!!

- 1868, 1883, 1887, 1912, 1922, 1936, 1941, 1948, and in 1952
- The 1952 fire caused over 1.5 million dollars in damage.
- On June 22, 1969, the Cuyahoga River caught fire in Cleveland, Ohio.
- 30 minute fire = \$50,000
- Clean Water Act Amendments of 1977



Subsection B3: Stormwater - NPDES

- Six minimum control measures of the NPDES Phase II Program
 - Public Education and Outreach
 - Public Involvement and Participation
 - Illicit Discharge Detection and Elimination
 - Construction Site Stormwater Runoff Control
 - Post-Construction Stormwater Management in New Development and Redevelopment
 - Municipal Pollution Prevention and Good Housekeeping

Policy Recommendations

- Educate the public (countywide) of possible point and non-point source pollutants that can enter into various water bodies such as ponds, lakes, rivers, streams, wetlands and sensitive groundwater recharge areas.
- Develop and distribute training materials for commercial and industrial businesses for pollution prevention and good housekeeping practices with regard to point pollution discharge, water conservation, recharge potential, and water quality.

Policy Recommendations, continued.

- Educate the public on the importance of stream quality classification and the need for protection.
- Support community efforts for best management practice program participation events.
- Utilize school programs, brochures, articles, and water conservation events to help educate the public on all above topics.

Policy Recommendations, continued.

- Coordinate countywide stormwater and sanitary drainage system mapping information sharing through utilizing the County's GIS application of ATHENA, the publicly available McHenry County GIS Web Viewer
- Develop a coordinated NPDES MS4 Phase II program with local government entities to further advance education and public involvement countywide and enhance ordinances in the McHenry County Stormwater Management Program for Construction Site Stormwater Runoff Control and Post-Construction Stormwater Management in New Development and Redevelopment with the inclusion of low-impact design conservation practices and green infrastructure.

COUNTY OF MCHENRY

DIVISION OF WATER RESOURCES

Winter Snow and Ice Operations



WINTER SNOW AND ICE OPERATIONS



Sources of Chloride

- Natural sources
- Point source discharges – e.g., wastewater treatment plants
- Non-point runoff sources – e.g., deicing operations
 - Determined to be major source



Impacts of Chloride

- On snow and ice: melting
- On infrastructure and vehicles: corrosion
- On vegetation: adverse growth effects
- On aquatic life: impairment
- On drinking water: salty taste
- Chloride does not biodegrade





Photo courtesy of Walt Kelly

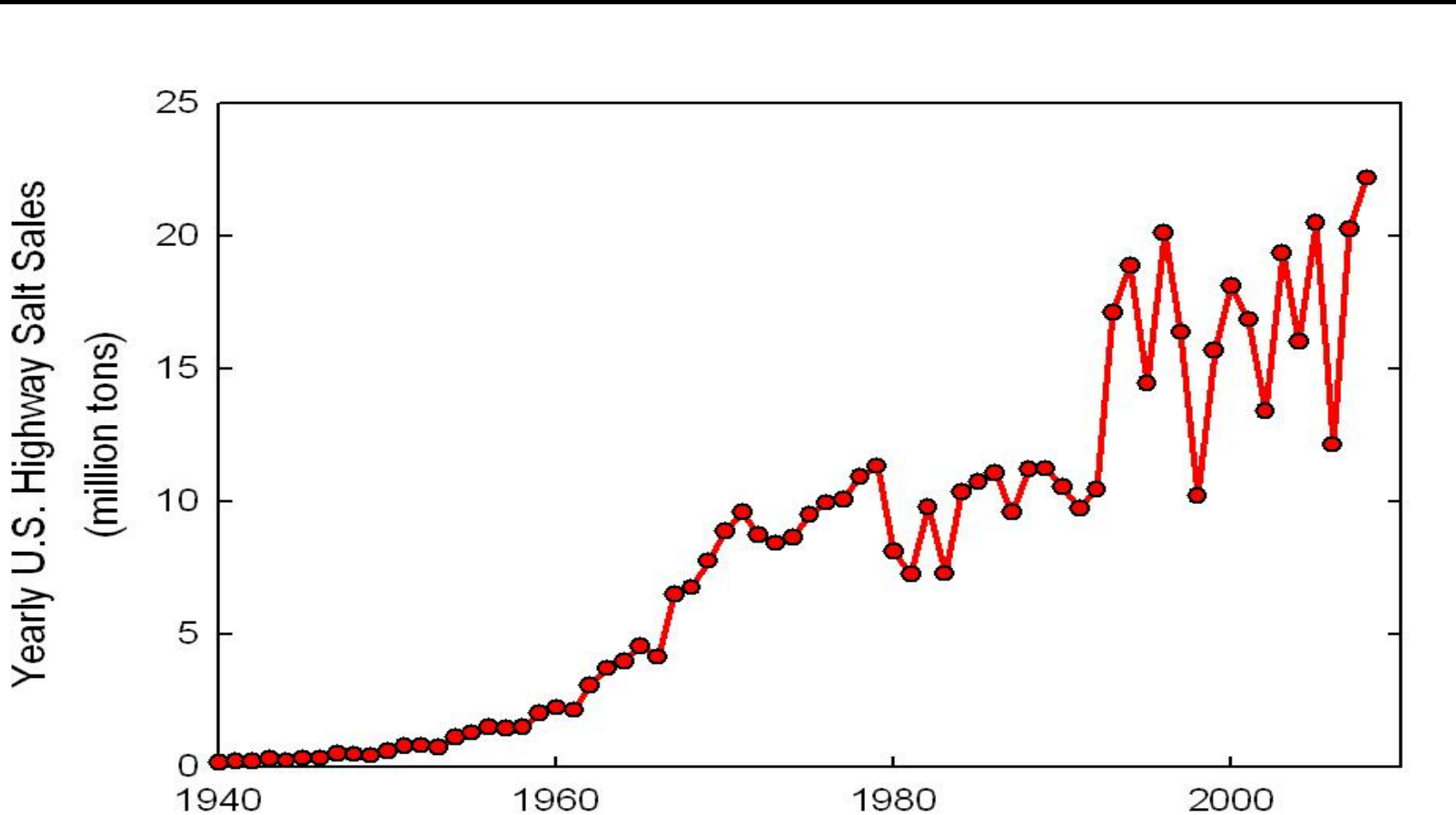
IT'S NOT JUST ROADS WE SALT!



COUNTY OF MCHENRY

DIVISION OF WATER RESOURCES

Road Salt in U.S.



alt Kelly

WINTER SNOW AND ICE OPERATIONS

Record highway salt sales

- United States Record salt sales
 - 2005 – 20.5 million tons of road salt
 - 2006 – 12.1 million tons
 - 2007 – 20.3 million tons
 - 2008 – 22.2 million ton

- What About McHenry County?
 - In 2010:
 - 60,000 tons ordered on the State Bid
 - Of that, County of McHenry DOT received 12,000 tons
 - Use an annual average of 9,000 tons



➤ Chicago's annual average road salt application: >270,000 tons (~155,000 MgCl₂/yr)

➤ State of Illinois Average Annual Salt Bid ~1.4 million tons

➤ This doesn't include private applicators, private bids, or other purchases.



**Chicagoland Region Used 1.8 million tons of salt...
How much is 1.8 million tons of salt?**

What if we stored it in solder field?















SALT & WATER

THE ENVIRONMENTAL IMPACTS OF TREATING ROADS



Once in solution, always in solution

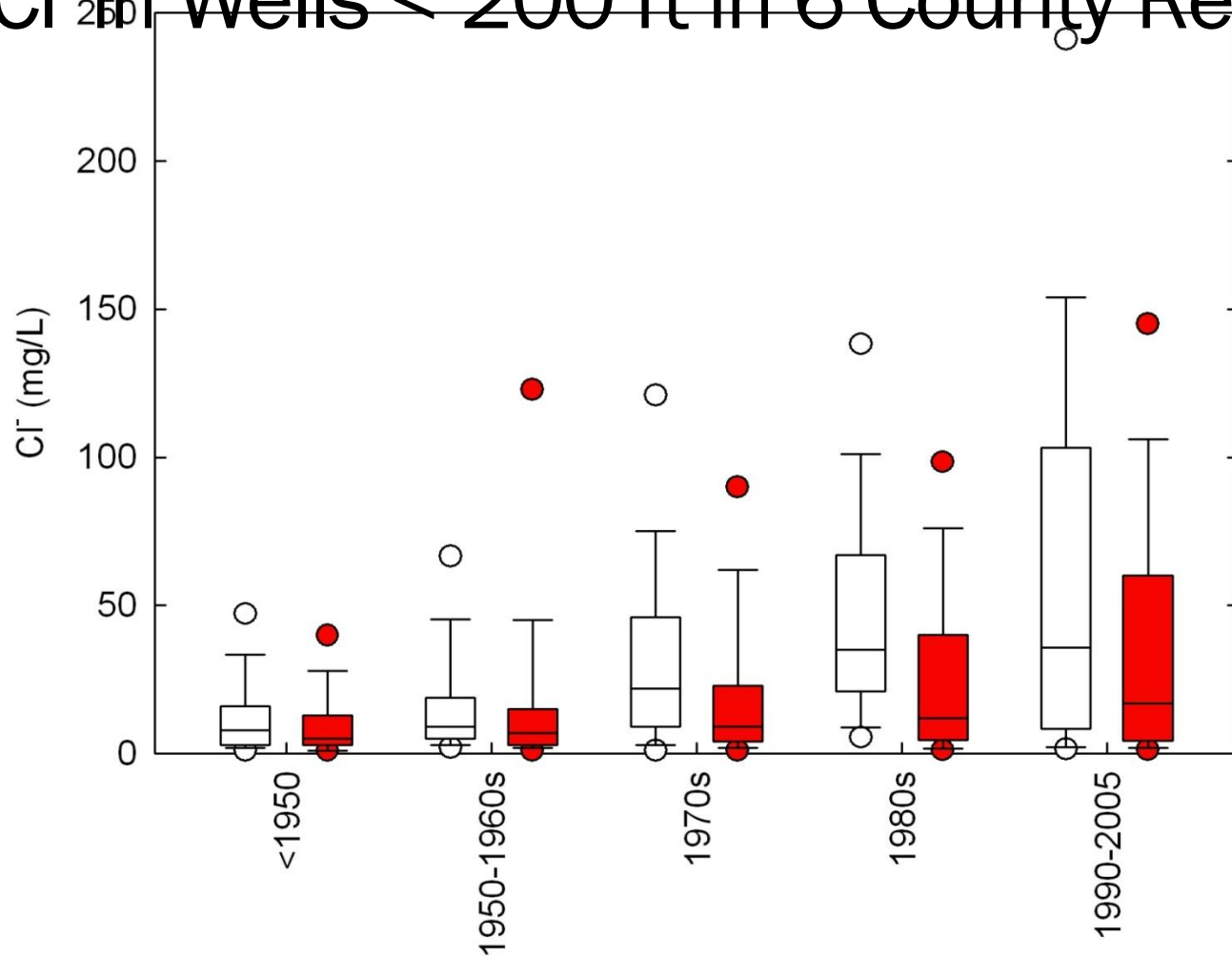


Chloride rate increases:

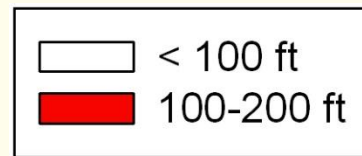
- More than half of the wells in DuPage, Kane, McHenry, and Will counties have Chlorides rising more than 1 mg/l/yr
 - 13% have increases greater than 4 mg/l/yr.
- Chloride concentrations have been recorded in excess of 1000-3500 mg/L in several shallow monitoring wells along major roadways.
 - Similar results have been found near improperly stored salts



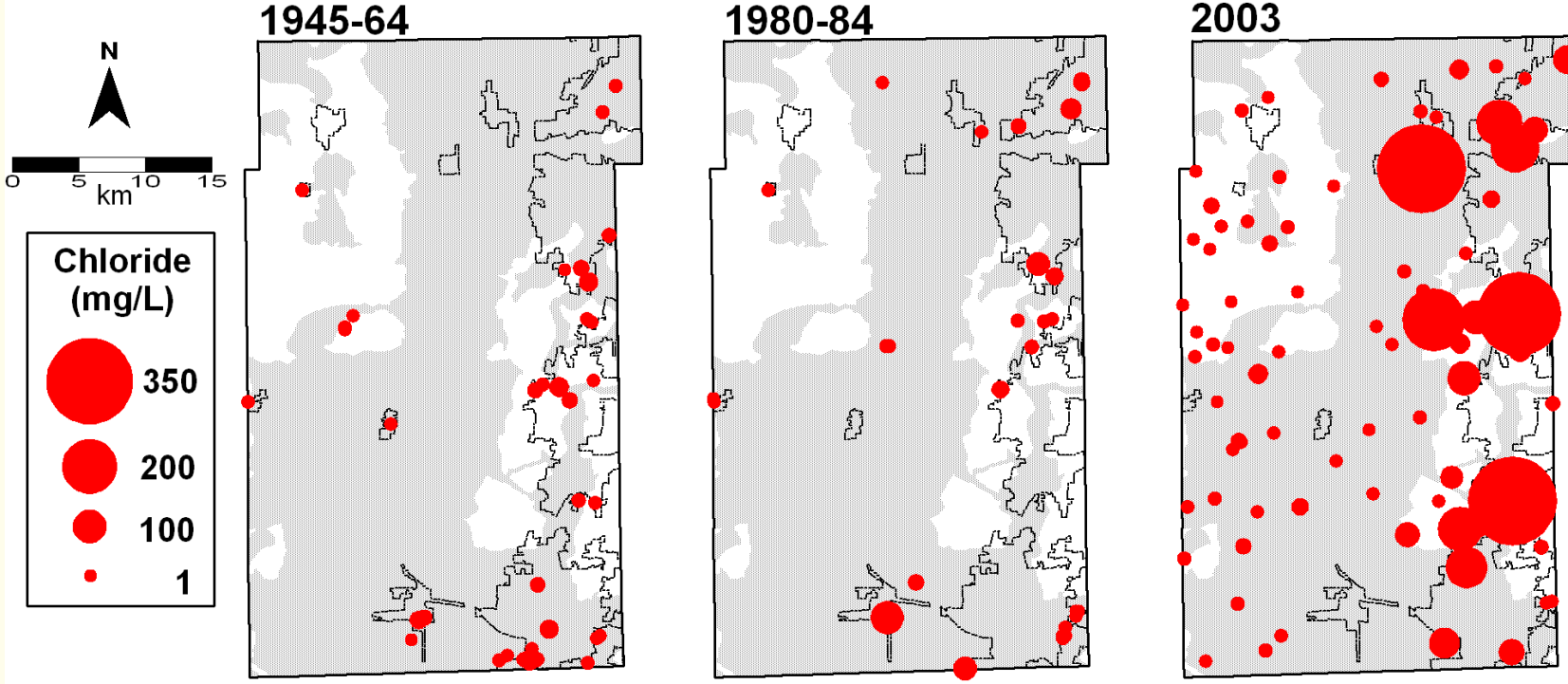
Cl⁻ in Wells < 200 ft in 6 County Region



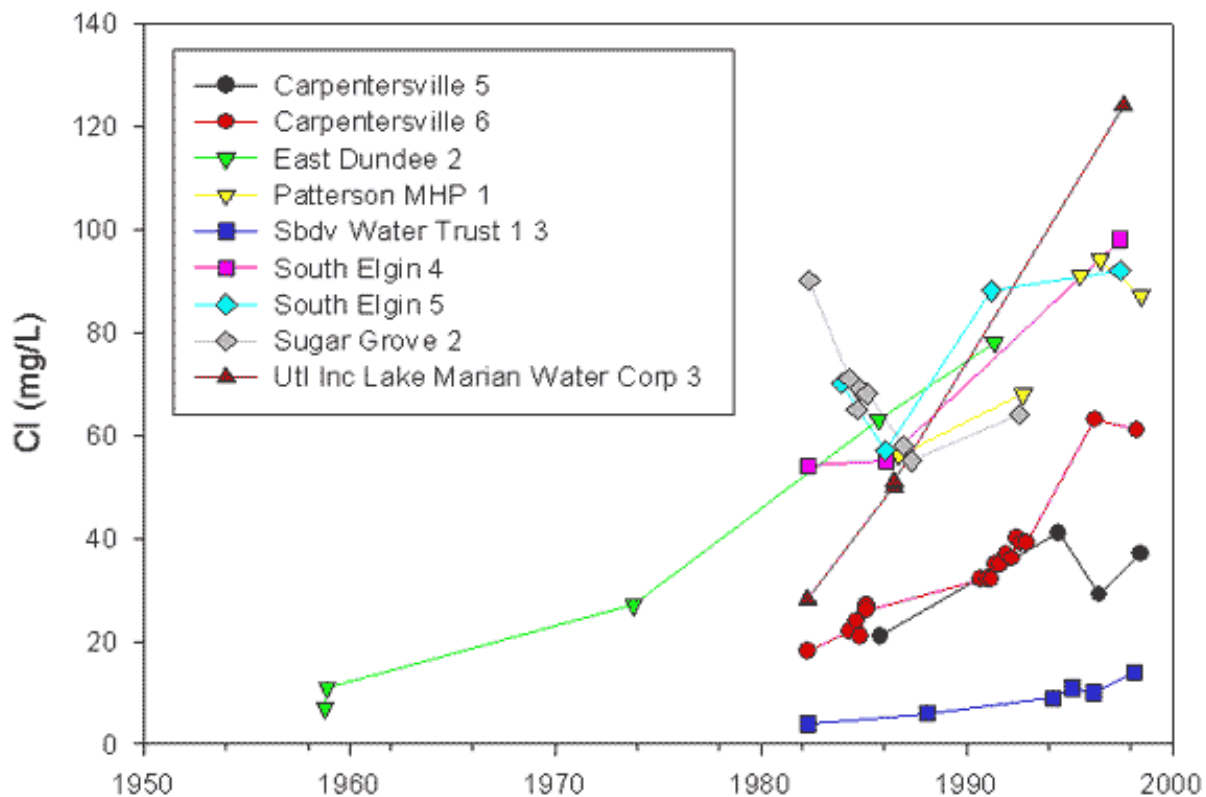
~4600 samples



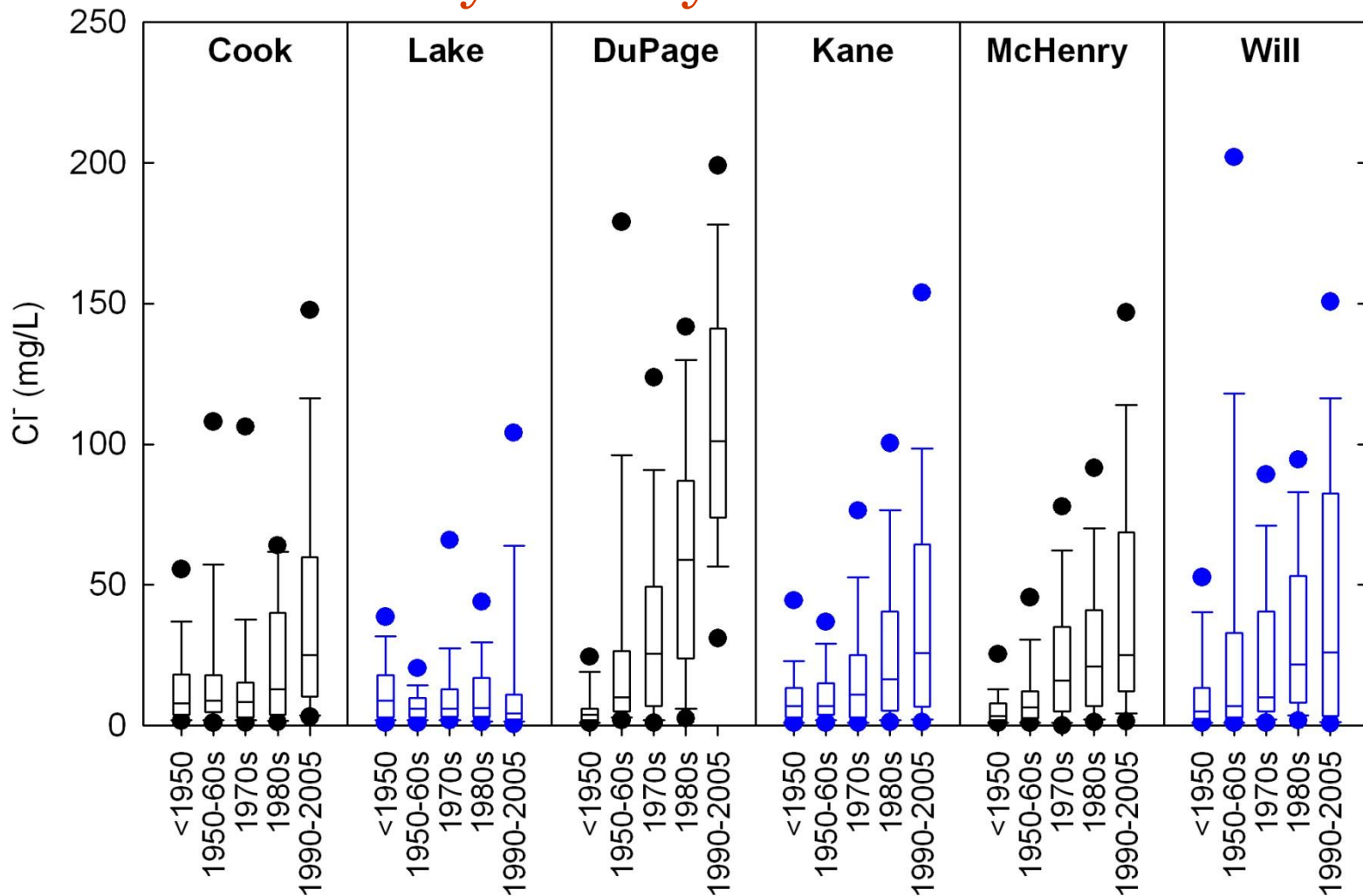
Kane County Shallow Aquifers: Chlorides



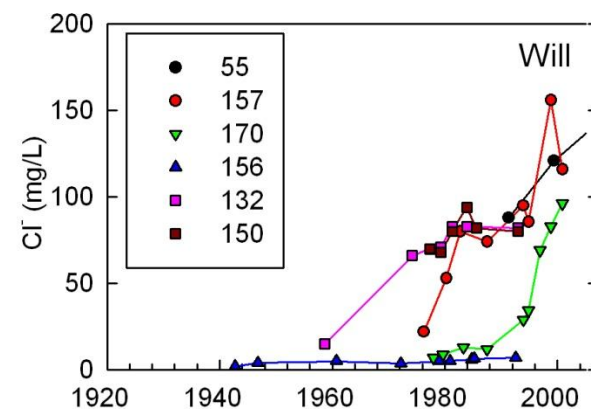
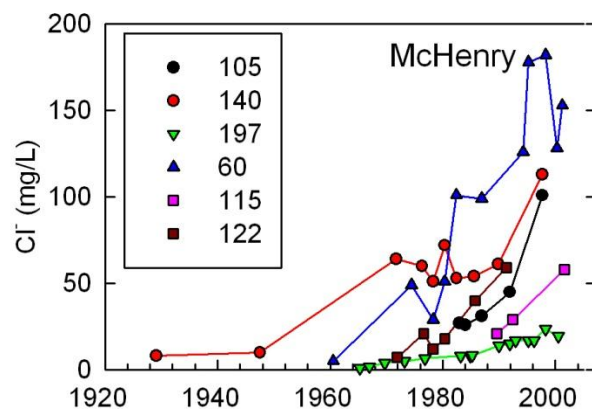
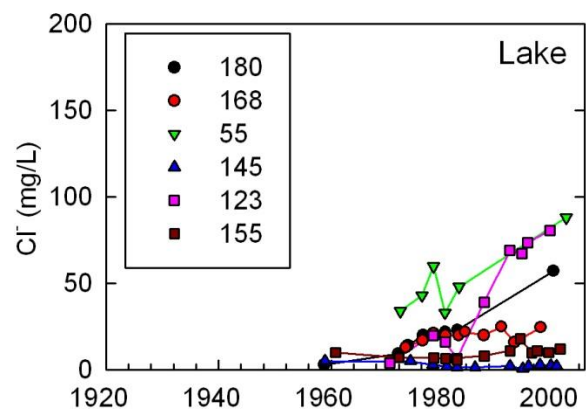
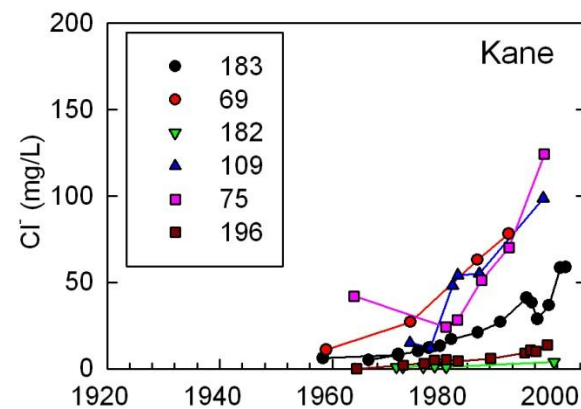
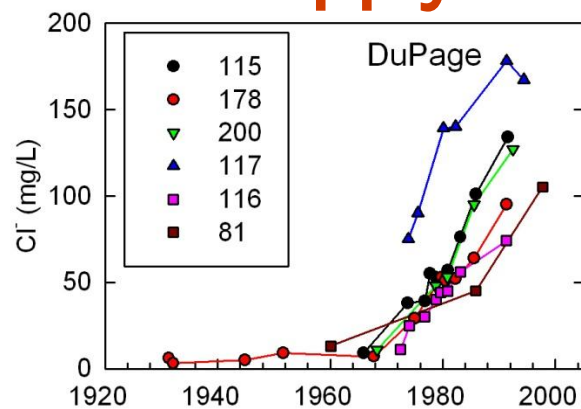
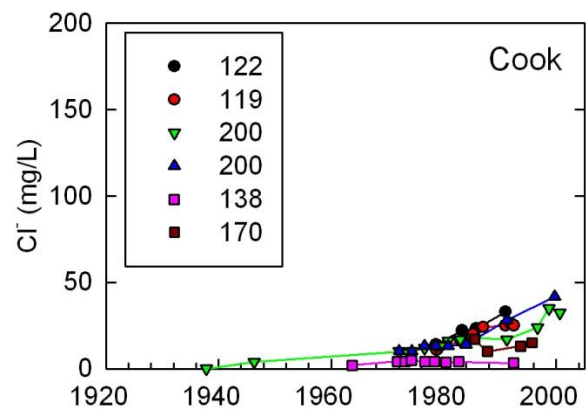
Water Quality Changes in Shallow Kane County Public Water System Wells



Chloride Levels by County



Cl⁻: Individual Public Supply Wells



55% have positive trends; >60% in DuPage, Will, Kane
37% > 1 mg/L/yr; 12% > 4 mg/L/yr

**Recap... What does this look like in
real life?**

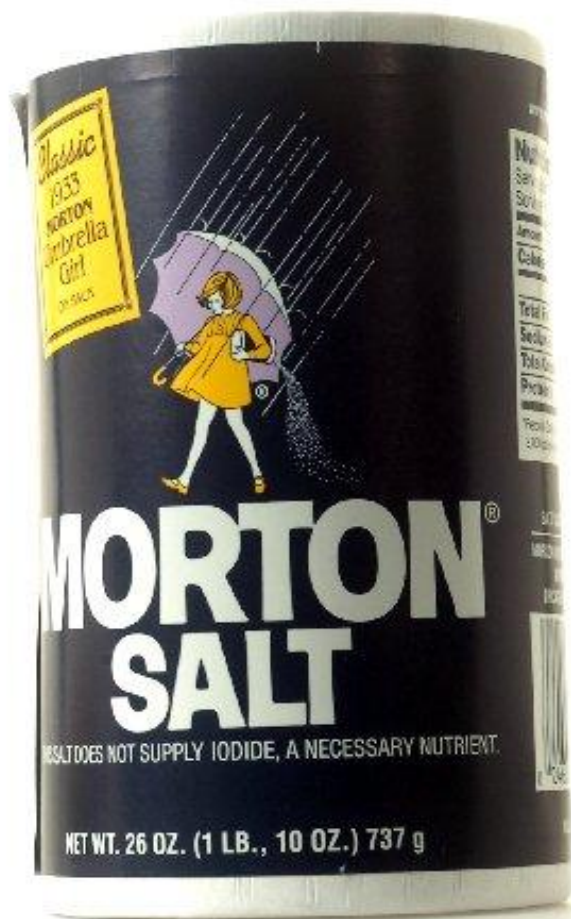


EPA: Drinking water < 1ts of salt
in 5 gallons of water.

Bluegills die @ concentrations $\frac{1}{2}$
cup or 25 ts of salt to 5 gallons of
water.

Once in solution always in
solution





About 1.5 pounds = 3 cups = 150 teaspoons

750 gallons above EPA drinkable limit

You should drink $\frac{1}{2}$ gallon a day
1500 days or **4 years** of drinking water

30 gallons unlivable to fish



COUNTY OF MCHENRY

DIVISION OF WATER RESOURCES



300pounds = 600cups = 28,800
teaspoons

144,000gallons above EPA drinkable
limit

You should drink $\frac{1}{2}$ gallon a day
288,000days or **800**years of drinking
water

6,000gallons unlivable to fish



COUNTY OF MCHENRY

DIVISION OF WATER RESOURCES



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

12,000,000gallons above EPA drinkable limit

You should drink $\frac{1}{2}$ gallon a day
24,000,000days or **65,000years** of drinking water

500,000gallons unlivable to fish



What Are Our Options?



Regulatory Control

- Federal Clean Water Act - USEPA
 - Waters shall be “fishable” and “swimmable”
- IEPA
 - Administers programs and NPDES permits
 - Develops TMDLs for impaired waters
- Counties / Communities
 - NPDES Phase II permit holders
 - Implementation guidance / ordinance,
 - Best Management Practices - BMPs



NPDES General Permit ILR40

- Within six minimum control measures required:
 - Pollution prevention for municipal operations
 - Prevent and reduce the discharge of pollutants to the maximum extent practicable
 - Training
 - BMPs for deicing / snow removal
 - Ensure the reduction of all pollutants of concern to the maximum extent practicable
- Additional requirements for TMDL waters



Locally: Develop An Action Plan

- County of McHenry – Division of Water Resources:
Water Resources Action Plan
 - Section II: Local Water Quantity and Quality
 - Subsection B6 Winter Snow and Ice Operations
 - Storage and Handling
 - Application
 - Training and Certification



Implement Action Plan

- Encourage/require all operators to become certified
- Encourage/require all facilities or operators to have an approved Salt Storage and Handling Plan
- Permit all salt storage facilities, large or small



McHenry County's Program: Training and Certification...

- Public and Private Sector
 - Municipalities and Townships
 - Commercial Applicators
 - Mom and Pop's
- Who:
 - Operators, Supervisors, Schools, Commercial and Industrial Facilities, Contracting Person, and more



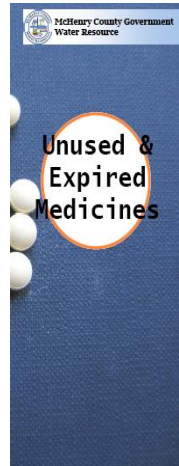
Training and Certification...

- Currently a Voluntary Certification Program
- 6 PDH's are offered
- Working towards requiring:
 - certification for all operators
 - permitting for all storage



Water Resources Website!

- ✓ Water Resources Action Plan
 - ✓ Model policies and ordinances
- ✓ Children's Activities
- ✓ Teacher Lesson Plans
- ✓ Brochures
- ✓ Groundwater Research
- ✓ Newspaper Articles



www.mchenryh2o.com

Projects Underway:

- Observation Wells – USACE, ISGS, & USGS
- 3-D Geological Mapping - ISGS
- Hydrologic Flow Modeling - ISWS
- Stream Gauging - USGS
- Water Quality Analysis – USACE & USGS



Winter Snow and Ice Operations – Training and Certification

- Public and Private Sector
 - Environmental Impacts
 - Storage
 - Handling
 - Application Rates
 - Material Options
 - Anti-icing
 - De-icing



2010 Dates:

Friday, October 22

Friday, November 5

Closing Thought:

Consider the water supply implications of all decisions

- ✓ Encourage municipal leaders to make water supply planning part of your cities comprehensive plan
 - ✓ Value Water in all of its forms as a resource
 - ✓ Safe water is a basic requirement of life
 - ✓ Pass this information along to your friends and neighbors
- ✓ *Be a part of the solution, every drop counts!*



QUESTIONS?

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."

Aldo Leopold, A Sand County Almanac



Cassandra McKinney

Water Resources Manager - Division of Water Resources

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