

# Water Demand Scenarios for NE Illinois Study Area

Progress Report #1  
RWSPG Meeting  
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# Aims of the Study

- Prepare future water-demand scenarios for the 11-county regional planning area of Northeastern Illinois
- Include estimates of water use by major sectors in 5-year increments for the period 2010-2050
- Allocate future water use to major withdrawal points within the region

# Illinois Counties

The 11 counties include:

**Boone**

**Cook**

**DeKalb**

**DuPage**

**Kane**

**Kankakee**

**Kendall**

**Grundy**

**Lake**

**McHenry**

**Will**



# Completed Items

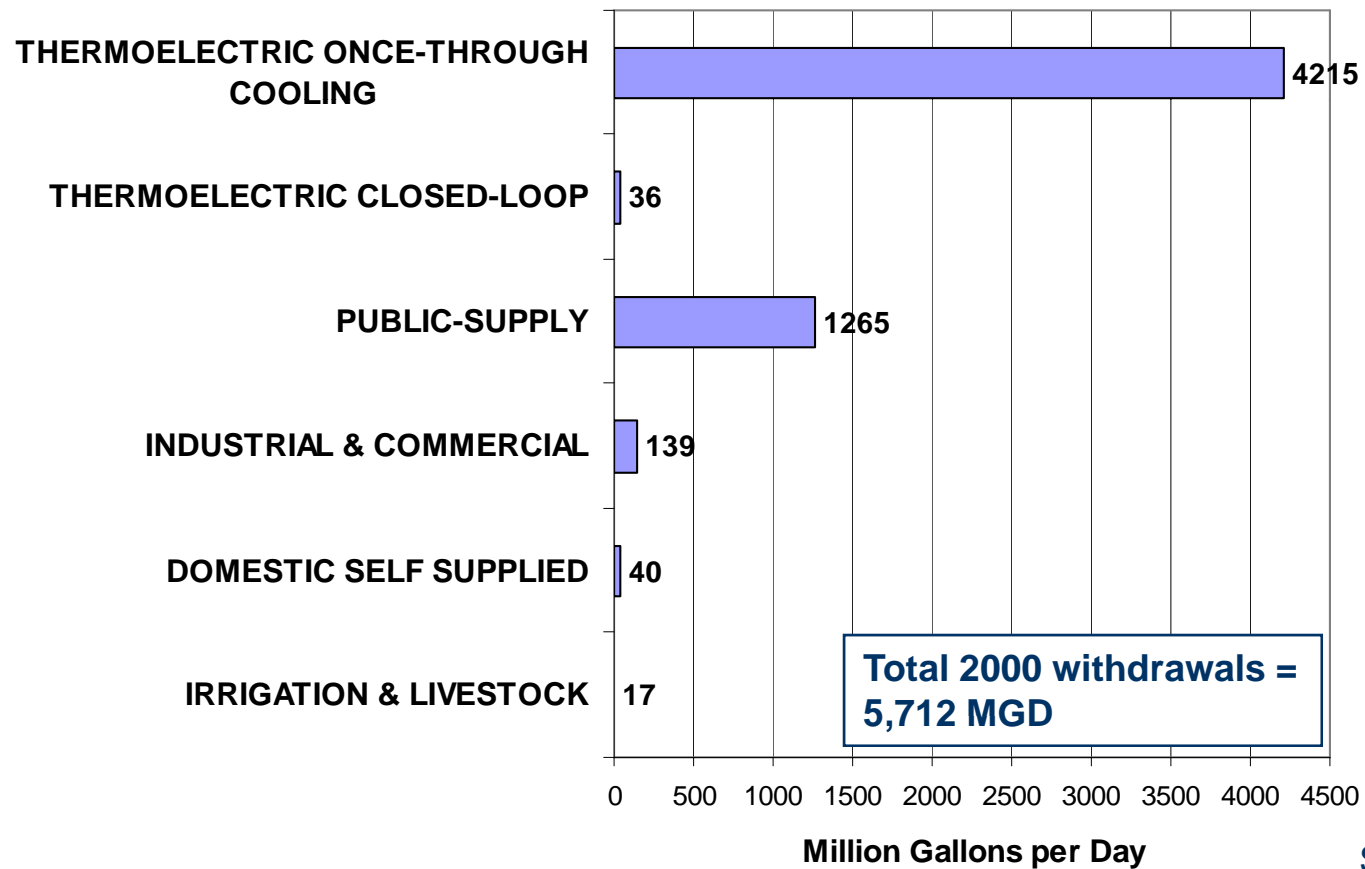
- Definition of sectors of water users
- Definitions of study areas and sub-areas
- Acquisition of historical water-use data
- Acquisition of socio-economic data
- Selection of assumptions for scenarios
- Completion & approval of Detailed Workplan

# Sectors of Water Users

Five major sectors (categories) of water use:

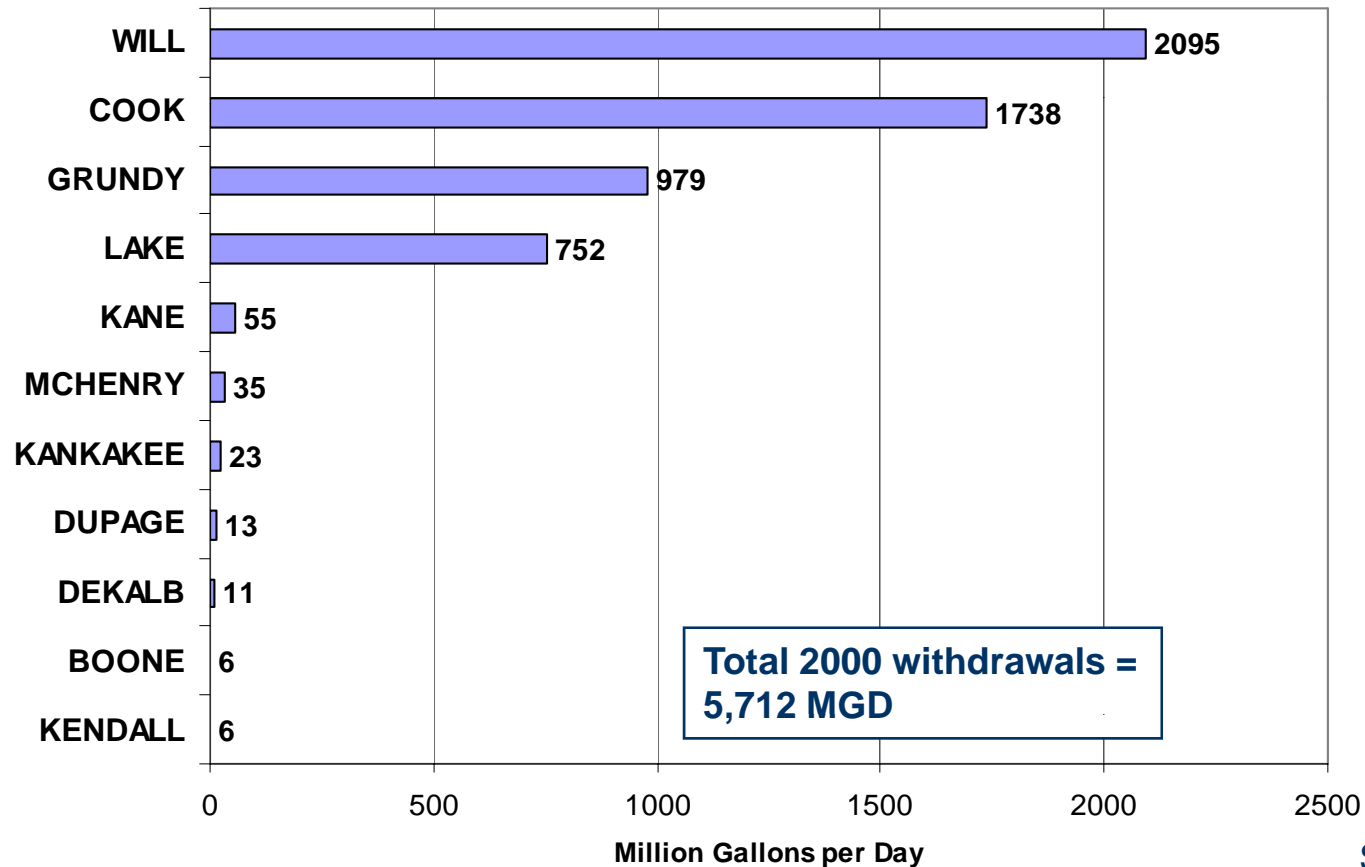
- Public supply (municipal & industrial ) sector
- Self-supplied commercial and industrial sector
- Power generation sector
- Other domestic sector
- Irrigation and agricultural sector

# Water Withdrawals - 11 county Area



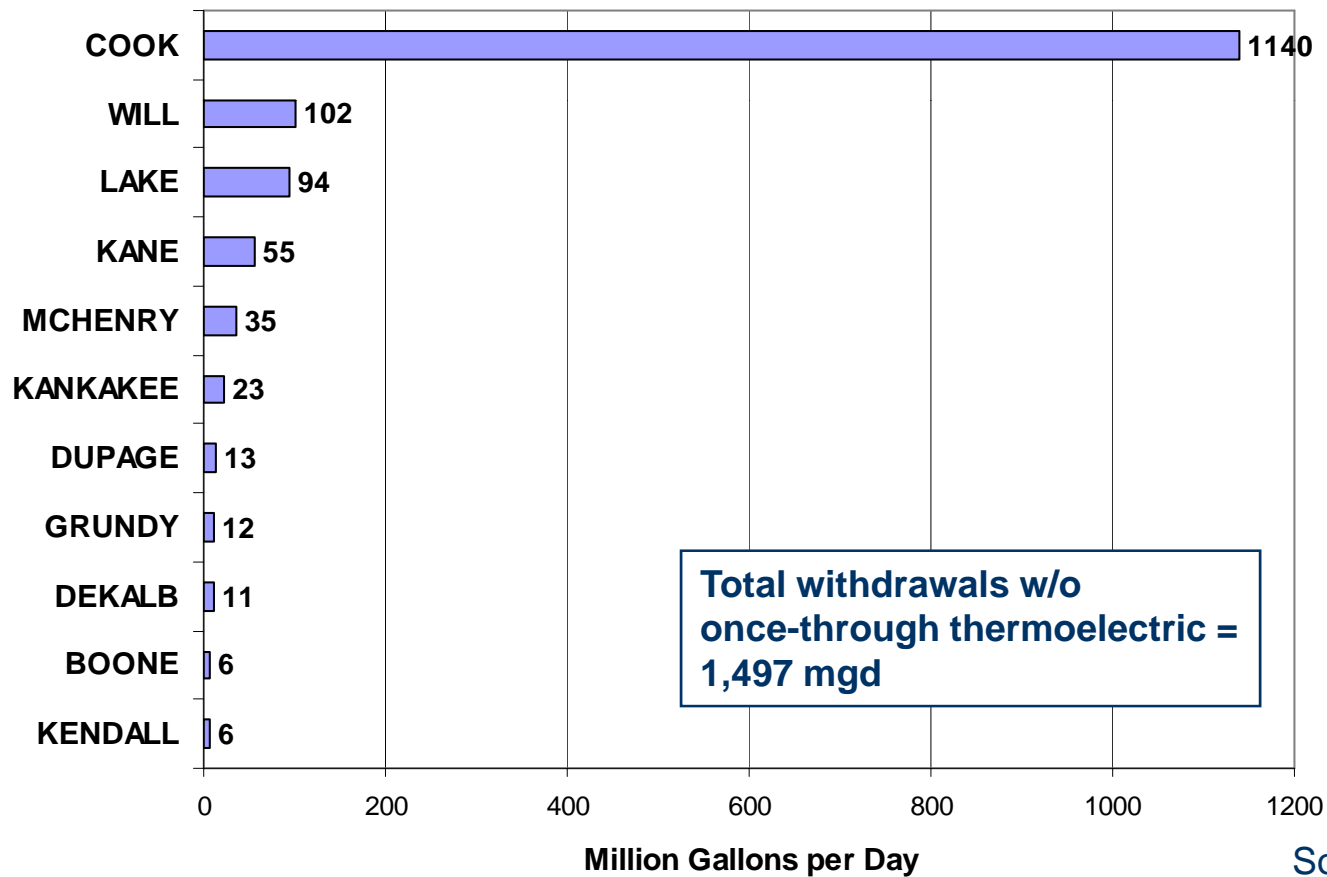
Source: USGS 2004

# 2000 Withdrawals by County with once-through thermoelectric



Source: USGS 2004

# 2000 Withdrawals by County without once-through thermoelectric



Source: USGS 2004



# Sectors and Study (Sub-) Areas within NE IL Region

- For public-supply sector:
  - 26 water supply service areas
  - 11 county metro areas (not included in the 26)
- For power generation sector:
  - Individual (9+) thermoelectric power plants
- For other domestic, self-supplied C&I, and agricultural/irrigation sectors
  - 11 counties

# NE Illinois Community Water Systems

County Served	CWS Systems	Population Served
BOONE	10	33,618
COOK	163	5,421,221
DEKALB	19	85,383
DUPAGE	53	787,898
GRUNDY	19	31,965
KANE	41	464,493
KANKAKEE	24	84,903
KENDALL	9	41,278
LAKE	106	595,692
MCHENRY	35	201,843
WILL	57	449,584
<b>Total</b>	<b>536</b>	<b>8,197,878</b>

Extracted from EPA SDWIS data, April 2007

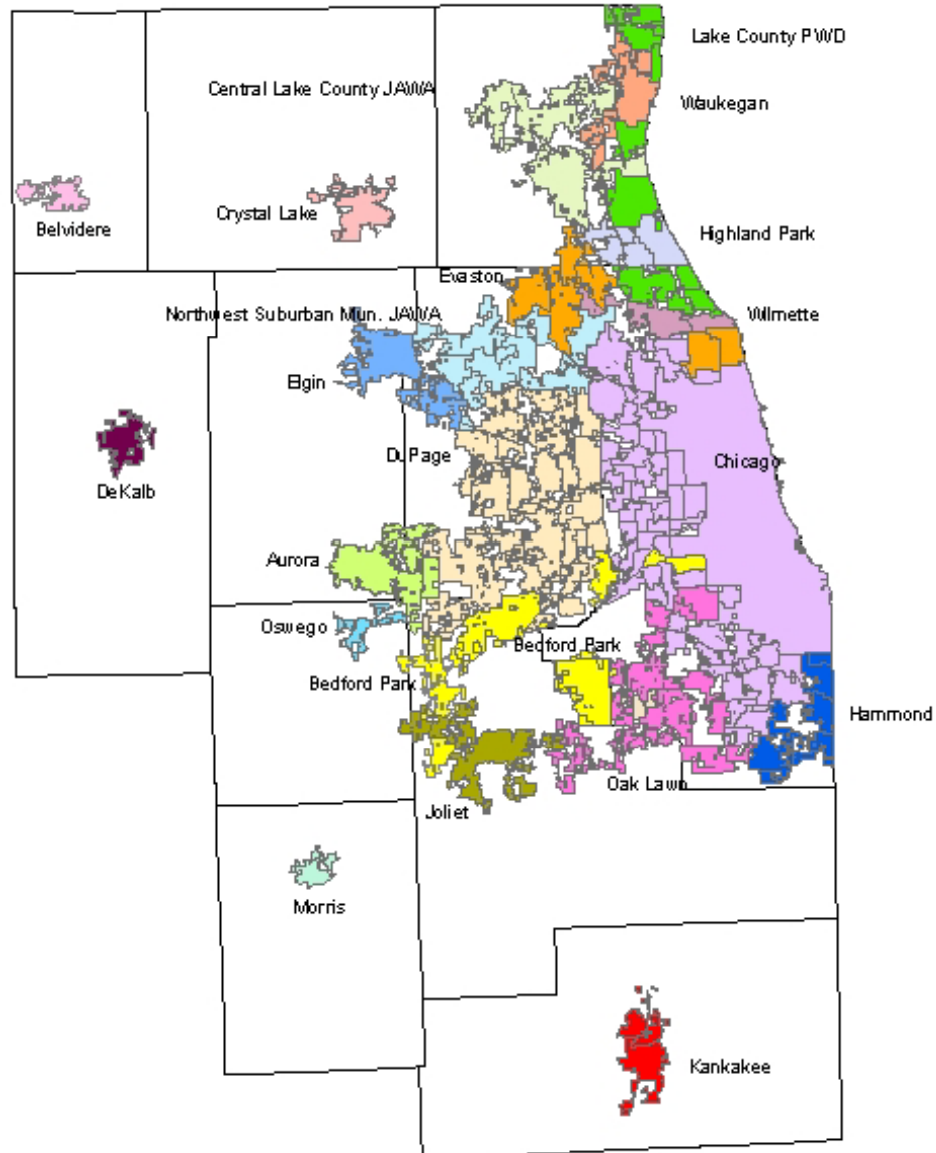
## Public-supply (M&I) Sector – Selected 37 Study Areas

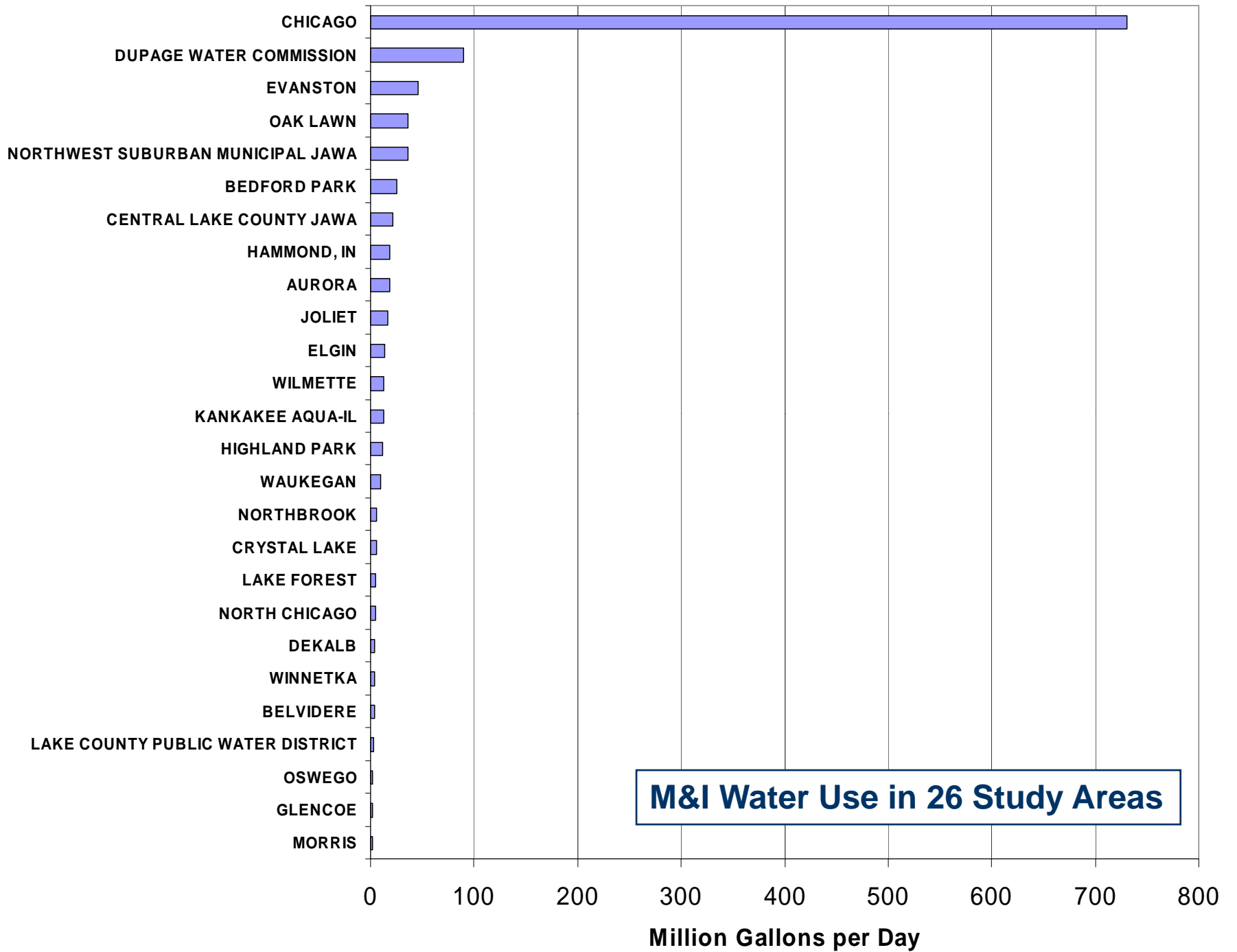
<b>Boone County MA +</b>
Belvidere
<b>Cook County MA +</b>
Chicago
Bedford Park
Evanston
Northwest Suburban Mun. JAWA
Oak Lawn
Wilmette
Glencoe
Northbrook
Winnetka
Hammond WWD
<b>DeKalb County MA +</b>
DeKalb
<b>DuPage County MA +</b>
DuPage WC (+part Aurora)
<b>Grundy County MA +</b>
Morris

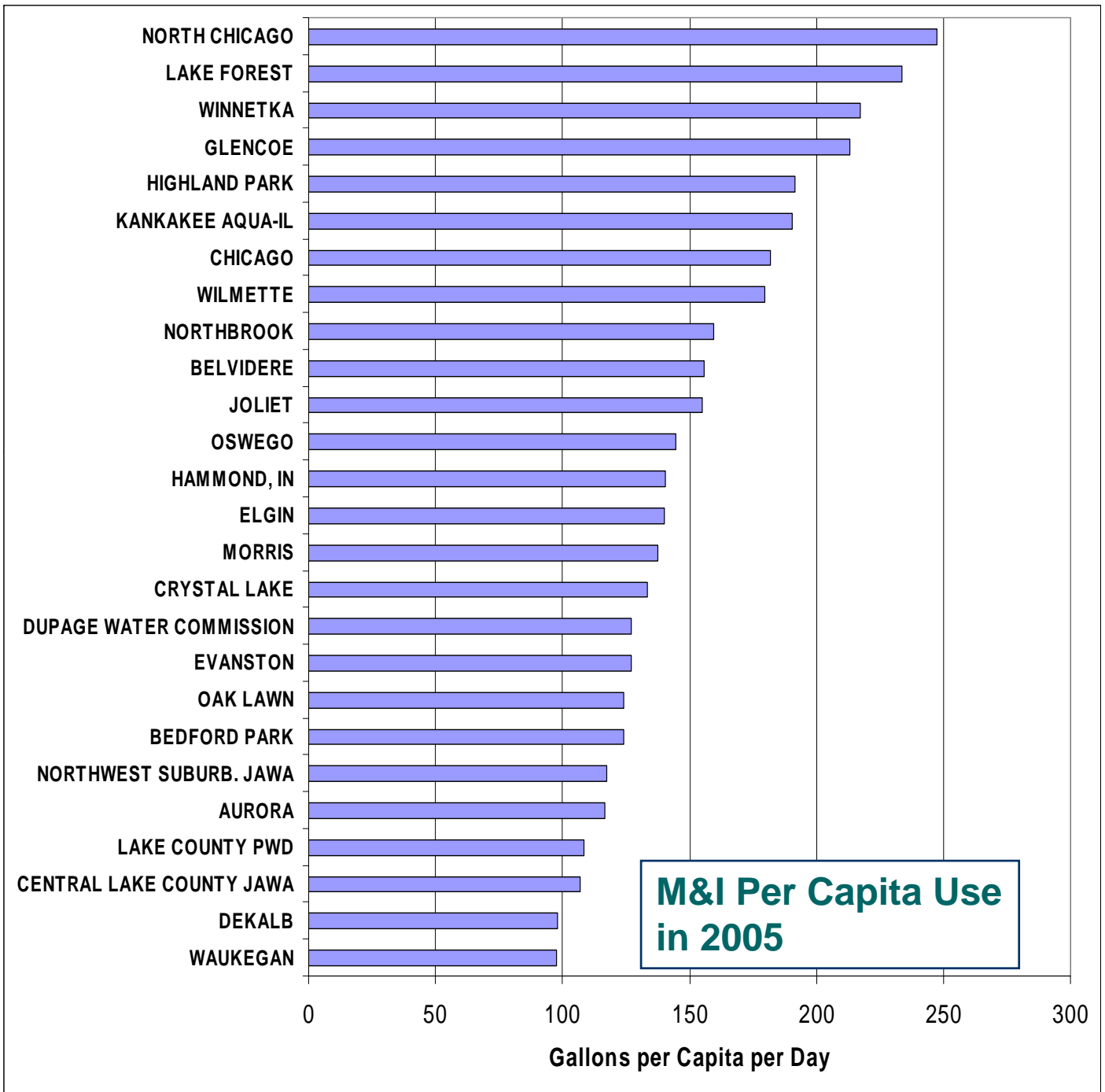
<b>Kane County MA +</b>
Aurora
Elgin
<b>Kankakee County MA +</b>
Kankakee-Aqua Illinois
<b>Kendall County MA +</b>
Oswego (+part Joliet)
<b>Lake County MA +</b>
Central Lake County JAWA
Highland Park
Waukegan
Lake County PWD
Lake Forest
North Chicago
<b>McHenry County MA +</b>
Crystal Lake
<b>Will County MA +</b>
Joliet

MA = Metro County Area

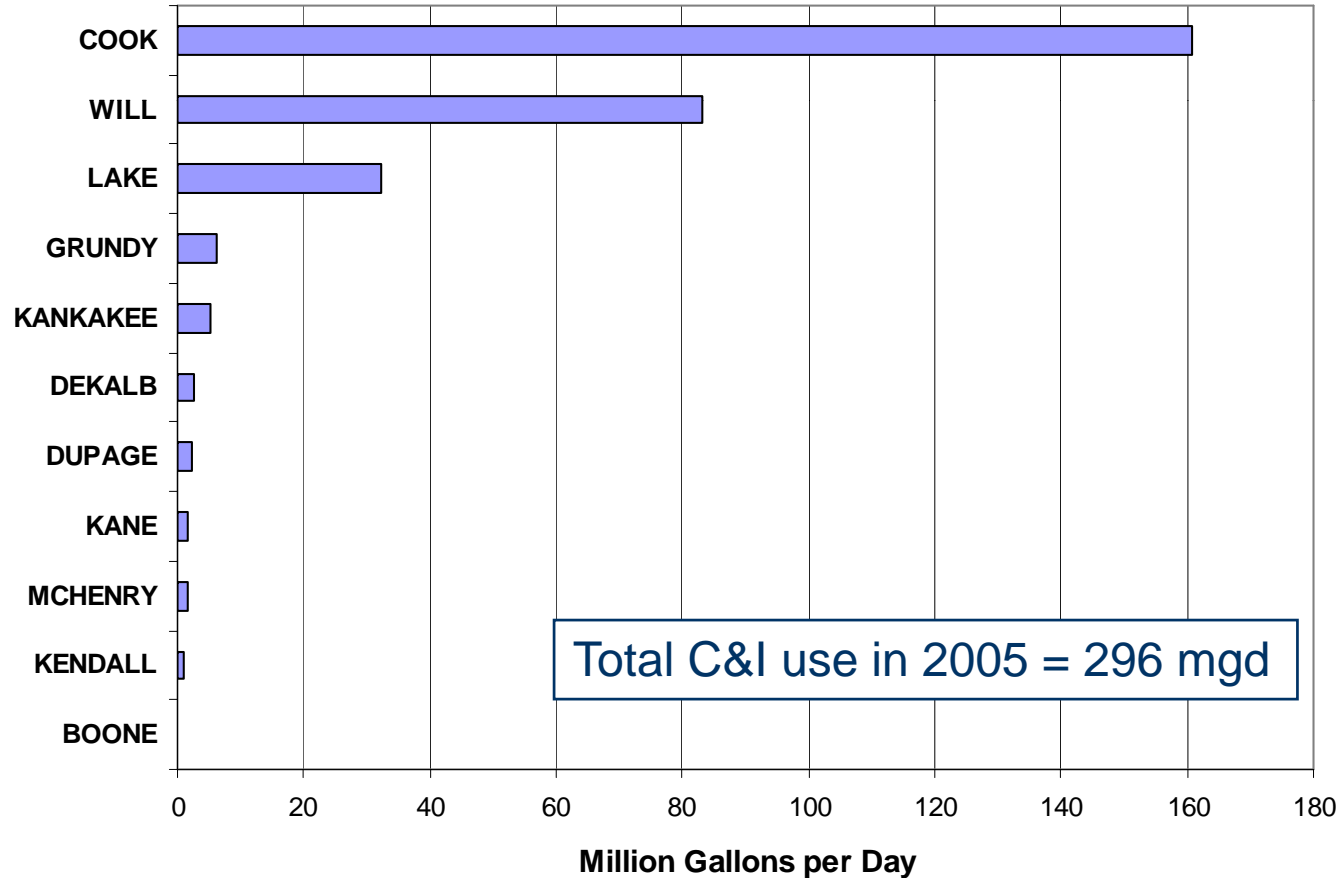
# Community Water Systems in Northeastern Illinois



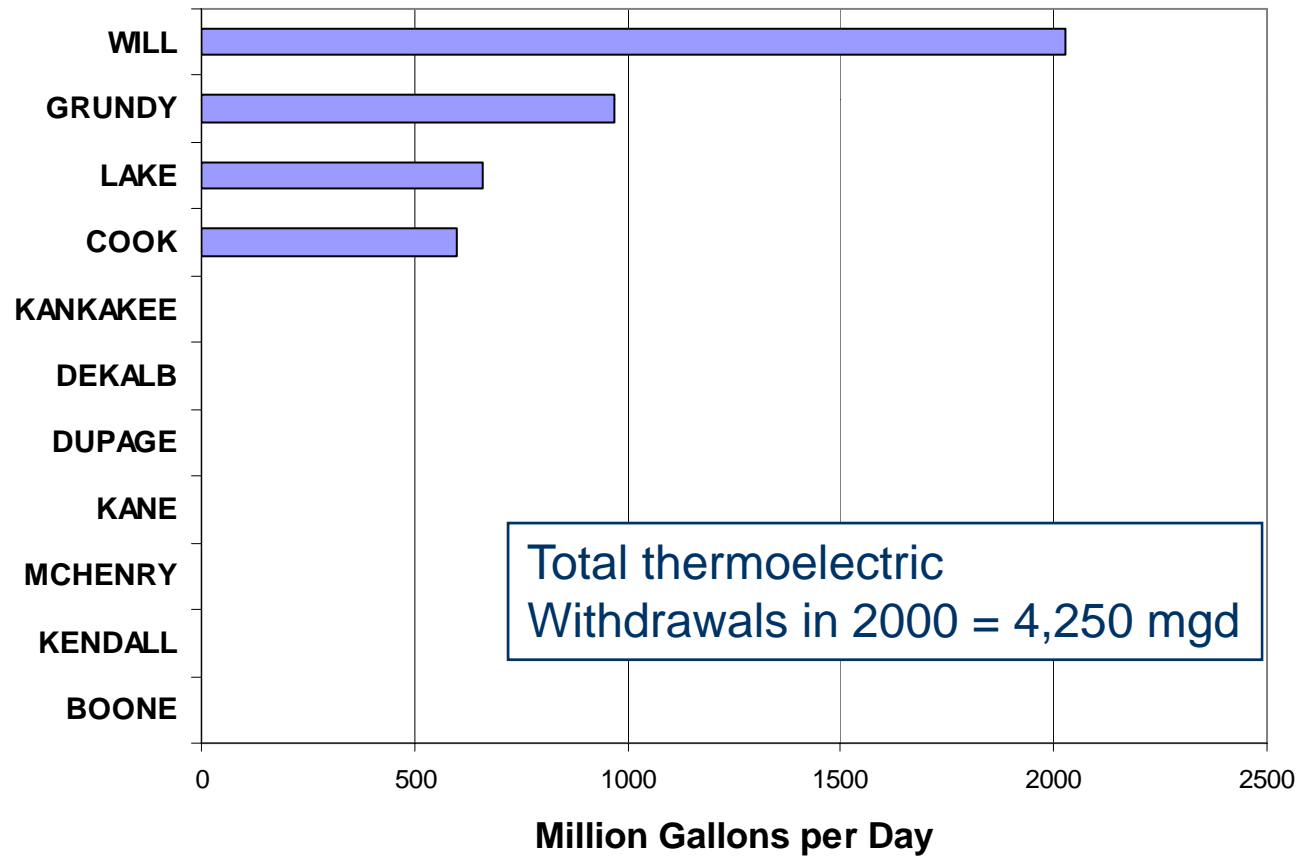




# Self-supplied Commercial and Industrial Sector

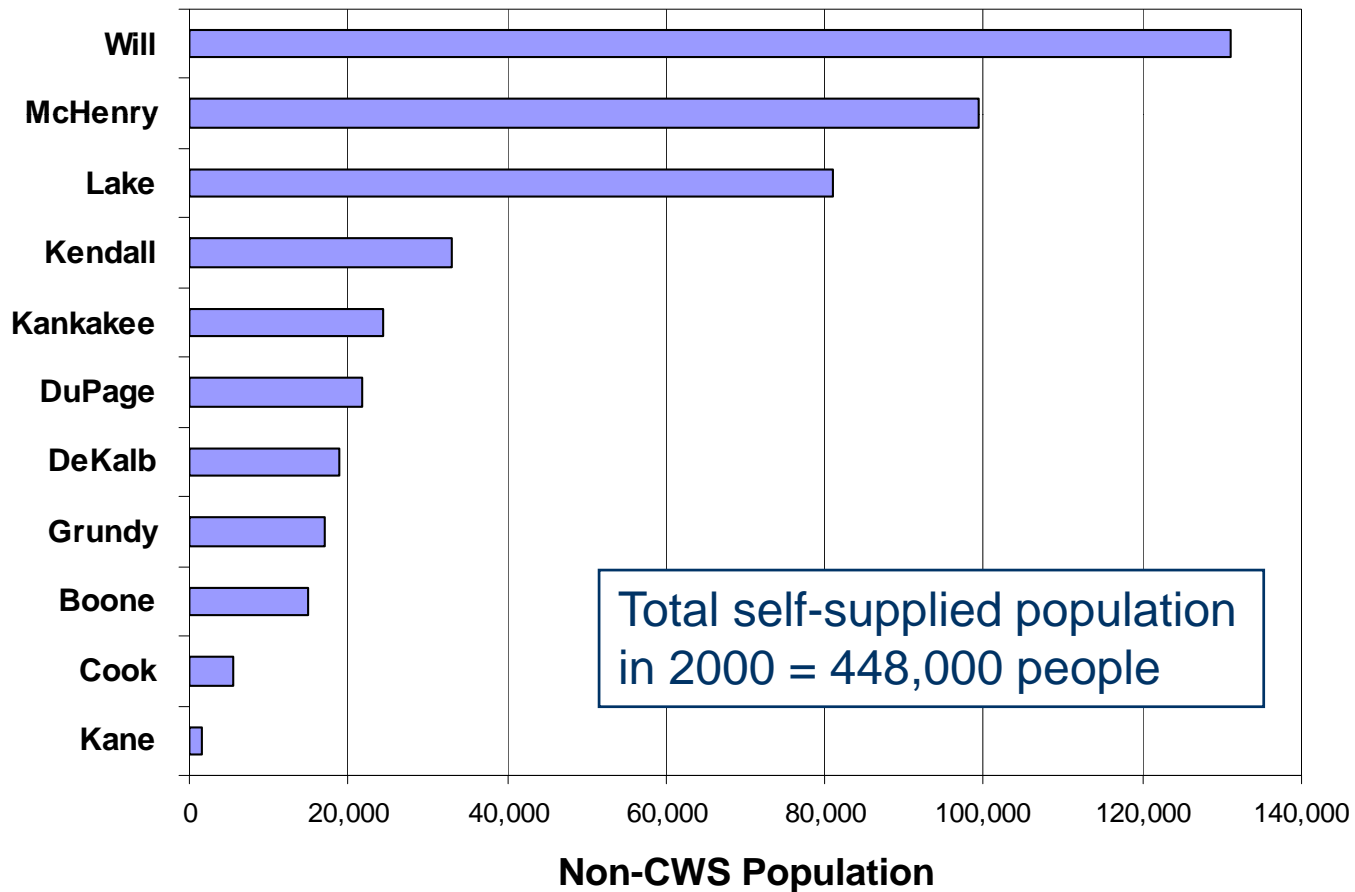


# Power Generation Sector

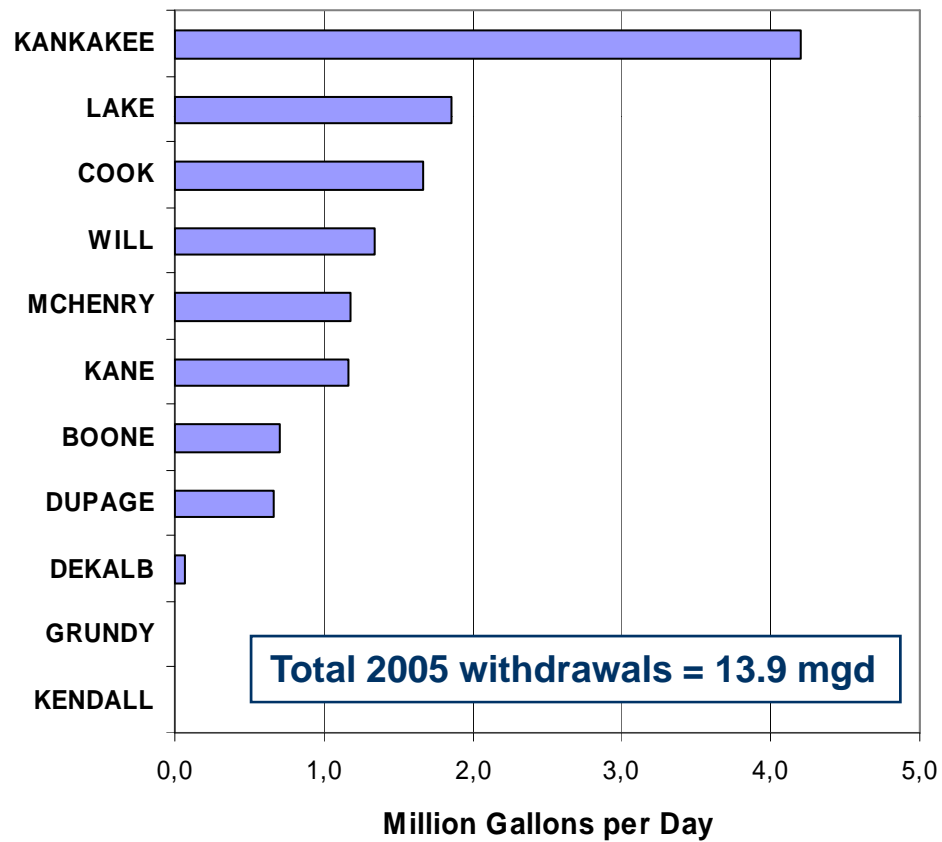




# Population of Self-supplied Domestic Sector



# Irrigation and Agricultural Sector



# Three Water Demand Scenarios

- ***Scenario 1 – Reference Path:***
  - The recent (last 10 to 20 years) trends in population growth and urban development patterns will continue.
  - The official projections of population and employment in the 11-county planning area represent “reference” growth.
  - Recent trends in the efficiency of water use will continue.
  - Water demand parameters will follow the recent historical trends or official/available projections.

# Three Water Demand Scenarios

- ***Scenario 2 – Less Resource Intensive (LRI) Path:***
  - The patterns of population and urban development within the study area will be adjusted to represent some aspects of “smart growth.”
  - More population growth will shift into counties with existing water infrastructure while keeping total population growth at the same level as in Scenario 1.
  - More water conservation (like BMP) will be included.
  - Water demand parameters would be assumed to shift to levels which result in lower water use.

# Three Water Demand Scenarios

- ***Scenario 3 – More Resource Intensive (MRI) Path:***
  - The distribution of growth (i.e., geographic growth pattern) would be such as to contribute to higher rates of water use.
  - Future growth of population will shift to the outlying (collar) counties while keeping total population growth at the same level as in Scenario 1.
  - The efficiency assumptions would include less water conservation than indicated by the recent trends in Scenario 1.

## Factors Affecting Future Water Demands in the 11-County Area of NE Illinois

Factor	Scenario 1- Reference Path	Scenario 2- Less Resource Intensive	Scenario 3 – More Resource Intensive
<b>Total population</b>	CMAP projections	CMAP projections	CMAP projections
<b>Population density and distribution of growth</b>	As implied by CMAP projections	More population and higher density in inner counties	More population and lower density in outer counties
<b>Commercial/ industrial activity</b>	CMAP projections	Adjusted to CMAP population projections	Adjusted to CMAP population projections
<b>Mix of commercial/ industrial activity</b>	Recent trend	Decrease in high water-using activities	Increase in high water-using activities
<b>Power generation</b>	Recent trend	No new power plants built within the study area	All new power plants in study area use cooling towers
<b>Employment-to-population ratio</b>	Recent trends	Adjusted to CMAP projections	Adjusted to CMAP projections
<b>Water conservation</b>	Recent trends	More active conservation	Conservation below recent trends (1/2)
<b>Future water prices</b>	Recent trends continue	Higher rates of future price increases	Prices held and 2005 level in real terms
<b>Per capita income</b>	Existing projections	Moderated growth of income	Higher than current projections
<b>Weather conditions: temperature</b>	1971-2000 average	1971-2000 average	1971-2000 average
<b>Weather conditions: precipitation</b>	1971-2000 average	1971-2000 average	1971-2000 average

# Sensitivity Analysis

- The primary variables for sensitivity analysis will include future climate (air temperature and precipitation) and possibly changes in region-wide growth of future population and employment.
- The range of climate variability will be specified as an increase in air temperature by 6°F and precipitation shifts within  $\pm 5$  inches, both to 2050 period.

# Items to be Completed

- Complete/verify five historical data sets (7/13/07)
- Data on seasonal and maximum-day use (7/20/07)
- Projections data from CMAP (7/31/07)
- Estimation of water-use models (7/27/07)
- Complete “Current Trends” scenario (8/15/07)
- Complete the LRI and MRS scenarios (9/28/07)
- Prepare data for sensitivity analysis (10/12/07)
- **Next RWSPG – October 23, 2007 in Geneva, Illinois**