Updating the Regional Water Demand Forecast

CMAP Land Use Working Committee

May 16, 2018

Agenda

- Purpose and timeframe
- Water 2050 Demand Forecast summary
- ON TO 2050 Water Demand Forecast overview
- Preliminary results
- Potential users of the forecast
- Next steps

Purpose and timeframe

Purpose

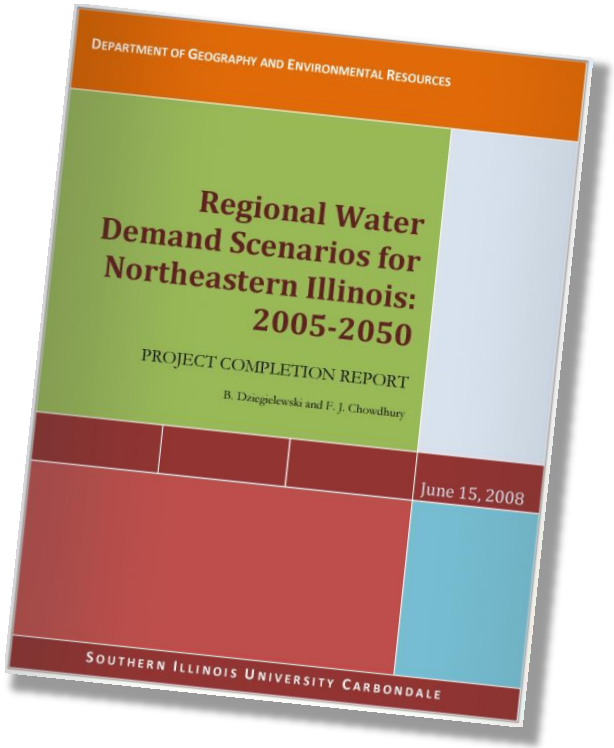
Provide an updated baseline water demand forecast for the 7-county region to the year 2050.

Timeframe

Complete analysis by end of June 2018

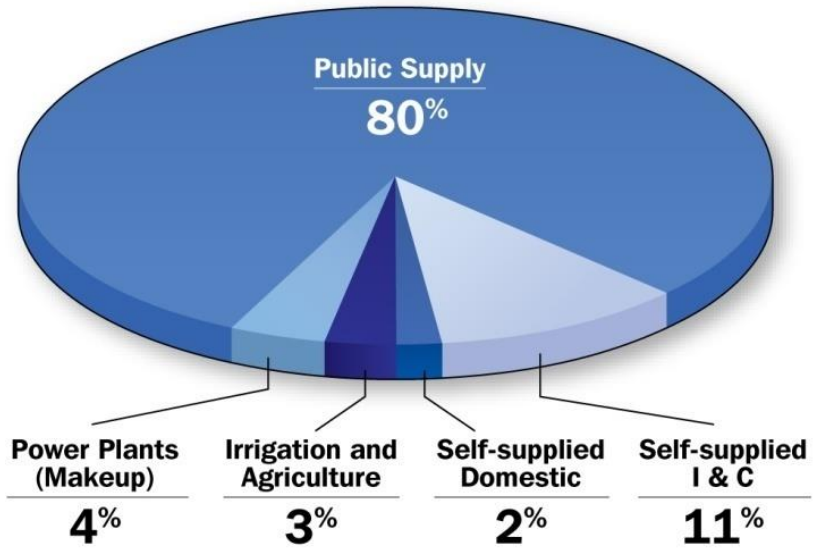
Water 2050 Demand Forecast Summary

- 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



Source: Dziegielewski. B. Water Demand Scenarios for NE Illinois Study Area Progress Report #1 RWSPG Meeting CMAP – June 26, 2007

Water Use



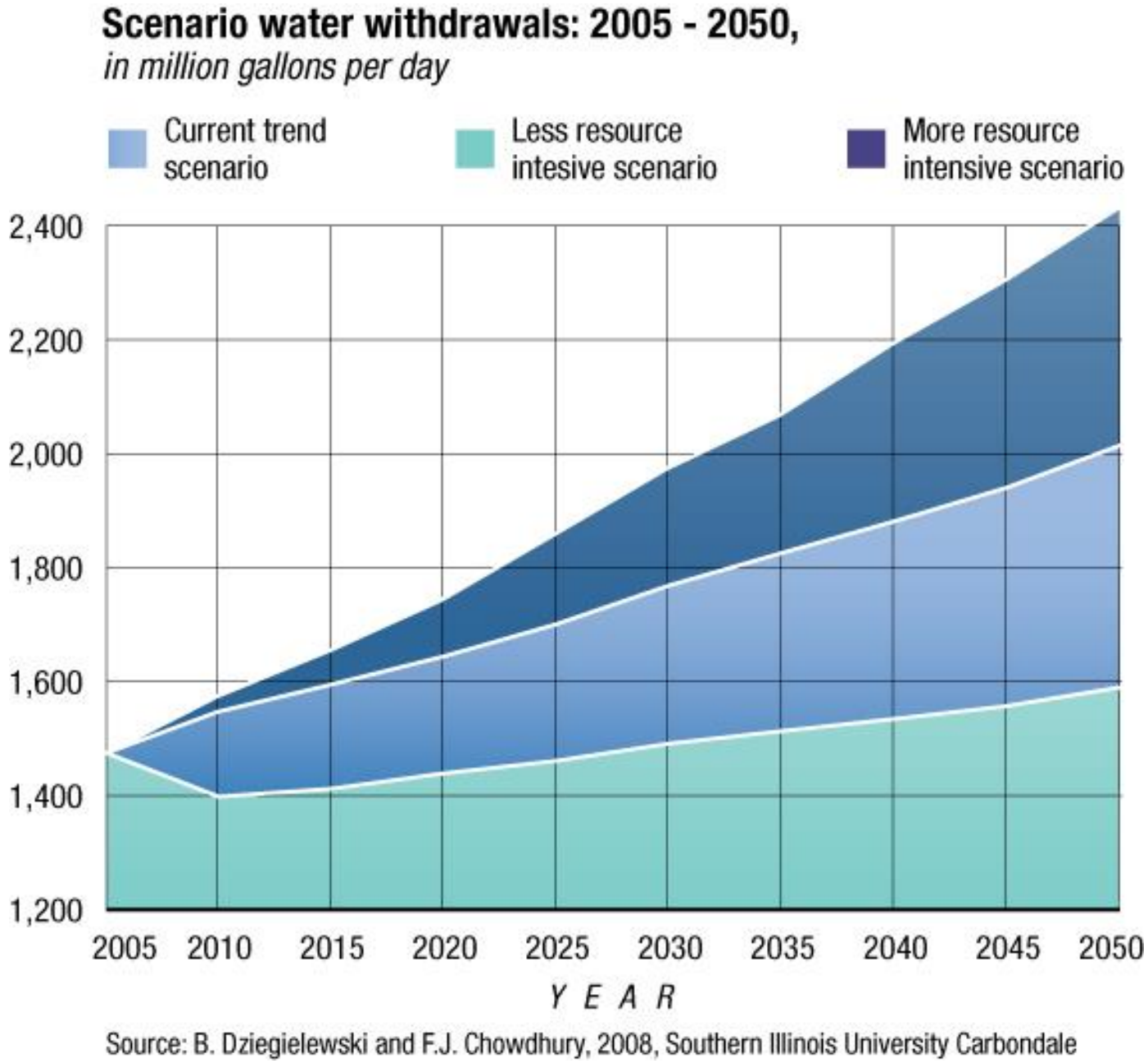
Source: B. Dziegielewski and F.J. Chowdhury, 2008

Excluding once-through power

- Public Supply
  - all publicly supplied customer classes (residential, industrial, commercial)
  - 26 water supply service areas
  - 11 county metro areas
- Self Supply (11 counties)
  - Domestic
  - Industrial & Commercial
  - Irrigation & Agriculture
  - Power Generation
    - Individual (9+) thermoelectric power plants

Water 2050

Three scenarios



ON TO 2050 Water Demand Forecast Overview

Goals:

1. Provide a municipal-scale forecast to promote integration of water demand considerations into land use and infrastructure planning.

2. Develop a transparent methodology that allows stakeholders to update their municipal-scale forecast based on new/updated data or potential alternatives.

Goal 1: Municipal Scale Forecast

- **Inform local planning:** Provide water demand information at the municipal scale, for incorporation in planning efforts

- **Not just utility based:** Municipal decision makers are making decisions that impact water demand overall, not just within their utility service area boundary.

- **Drawback:** Unknown service area boundaries requires assumptions based on well/intake locations

Goal 2: Develop transparent methodology

Three water use sectors:

1. Residential Water Supply (CWS and PWS)
2. Non-residential Water Supply (CWS, PWS, and Self-Supply)
3. Domestic Self Supply

Three forecast types:

1. Reference forecast (baseline unit use X ON TO 2050 Socioeconomic Forecast)
2. Baseline forecast (adjusted baseline unit use based on simple assumptions)
3. Updated Coefficients for Baseline Forecast using Demand Estimation

Goal 2: Develop transparent methodology

2. Baseline Forecast:

Simple assumptions can be made to adjust unit water use over time.

Demand driver assumptions for baseline forecast

Demand Drivers	Assumptions
Housing Density (-)	ON TO 2050 Population Forecast
Conservation trend* (-)	Historic trend of 0.7 annually 50% higher than historical trend
Total Employment (%)	ON TO 2050 Employment Forecast

Goal 2: Develop transparent methodology

3. Updated Coefficients for Baseline Forecast using Demand Estimation

- As project capacity and available data permits, develop updated demand equations using historic data (from 2000-2014)

- Resulting coefficients from these models will be applied to unit use calculations for gpcd/gped, and incorporated into the forecast.

Goal 2: Develop transparent methodology

3. Updated Coefficients for Baseline Forecast using Demand Estimation

- Priority 1: Residential Municipal-Scale Water Supply (CWS, PWS)
- Priority 2: Non-Residential Municipal-Scale Water Supply (CWS & PWS & Self-Supply)

Residential Municipal-Scale Water Supply (CWS & PWS) Demand Estimation Variables

Dependent Variables:

- GPCD

Independent Variables:

- Price
- Housing density
- Conservation trend
- Income
- Dummy variables

Non-Residential Municipal-Scale Water Supply (CWS, PWS, SS) Demand Estimation Variables

Dependent variable:

- GPED

Independent variables:

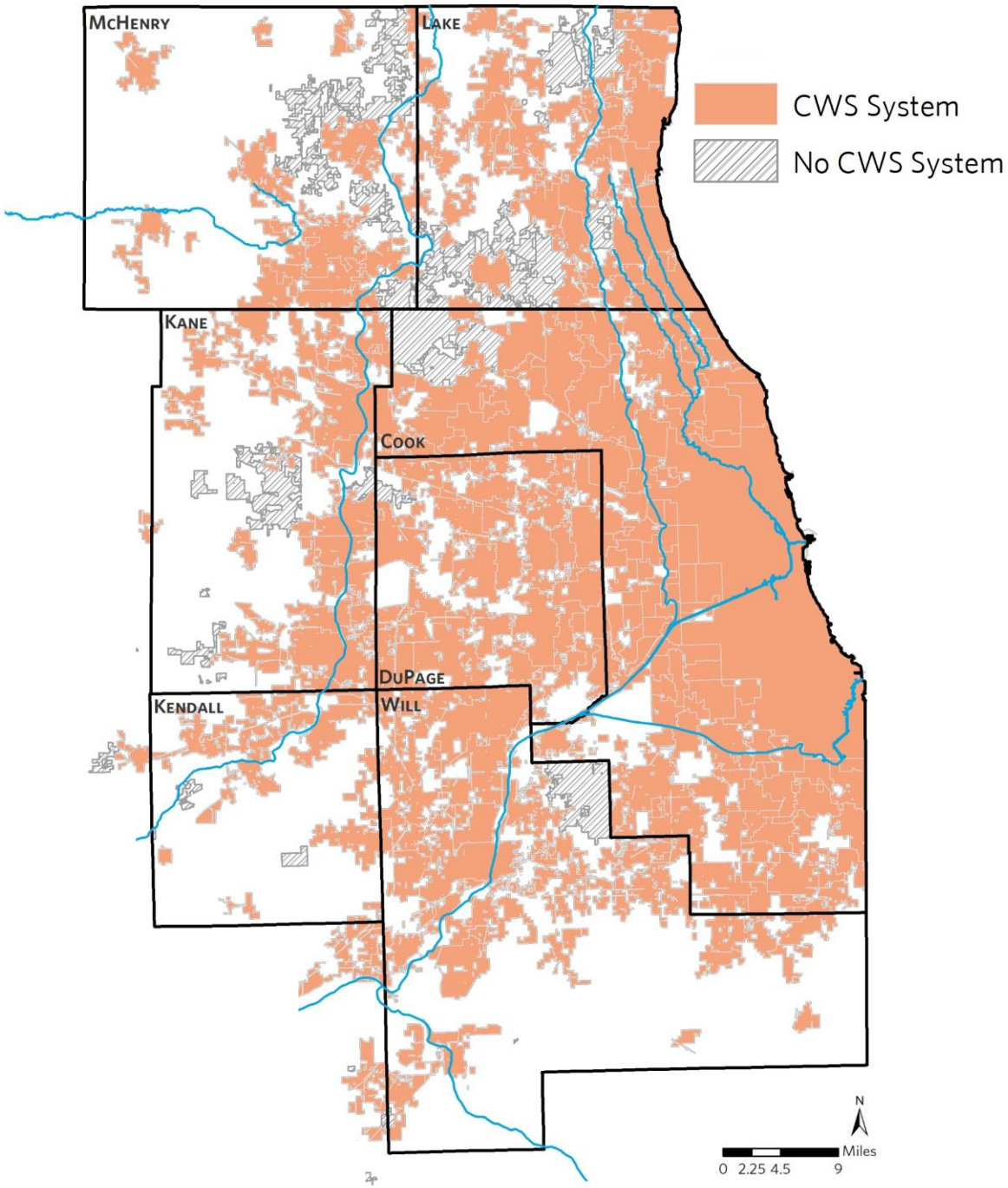
- Price
- Sectoral employment
- Conservation trend
- dummy variables

Preliminary results

~247 municipal-scale CWS systems

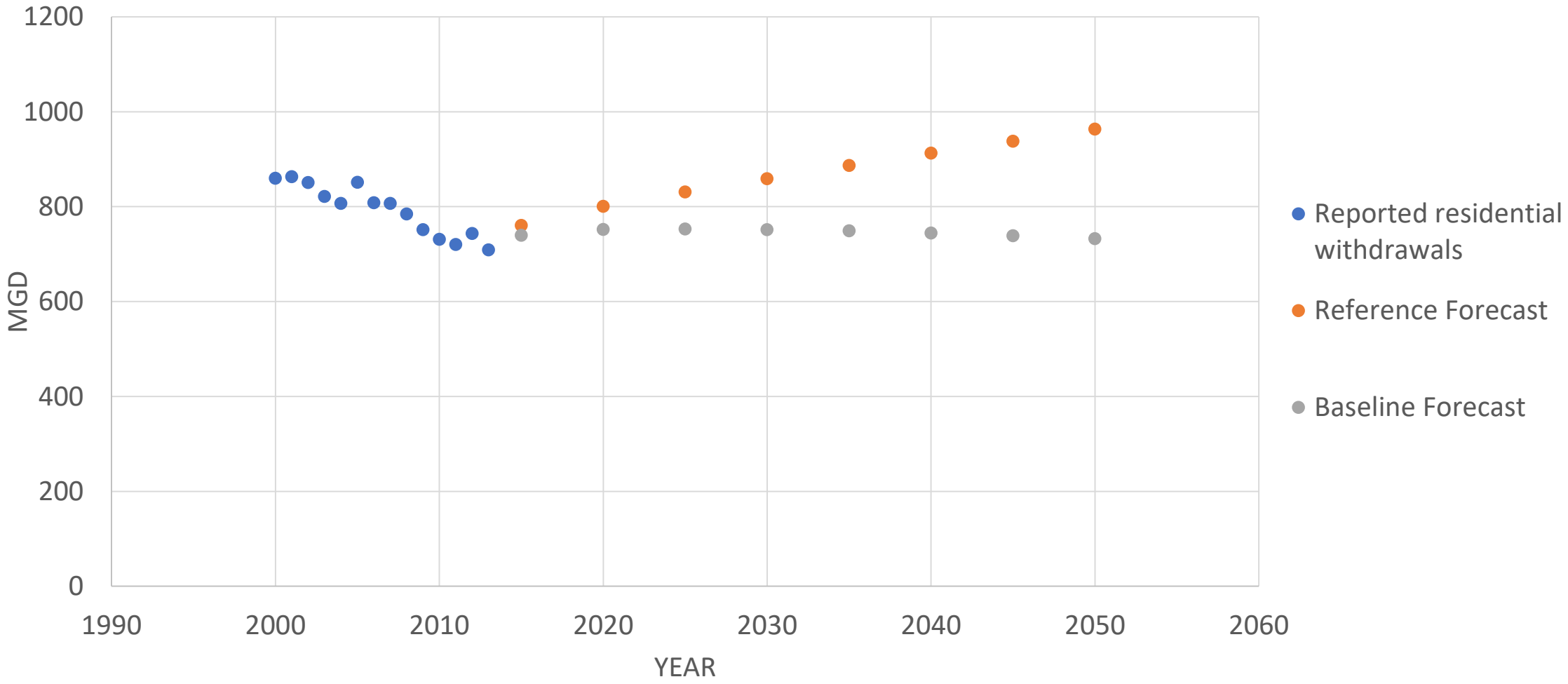
Other municipalities in the region on PWS and/or domestic self-supply.

- Any PWS values will be shown in the county remainders.
- Domestic self-supply will be addressed separately.

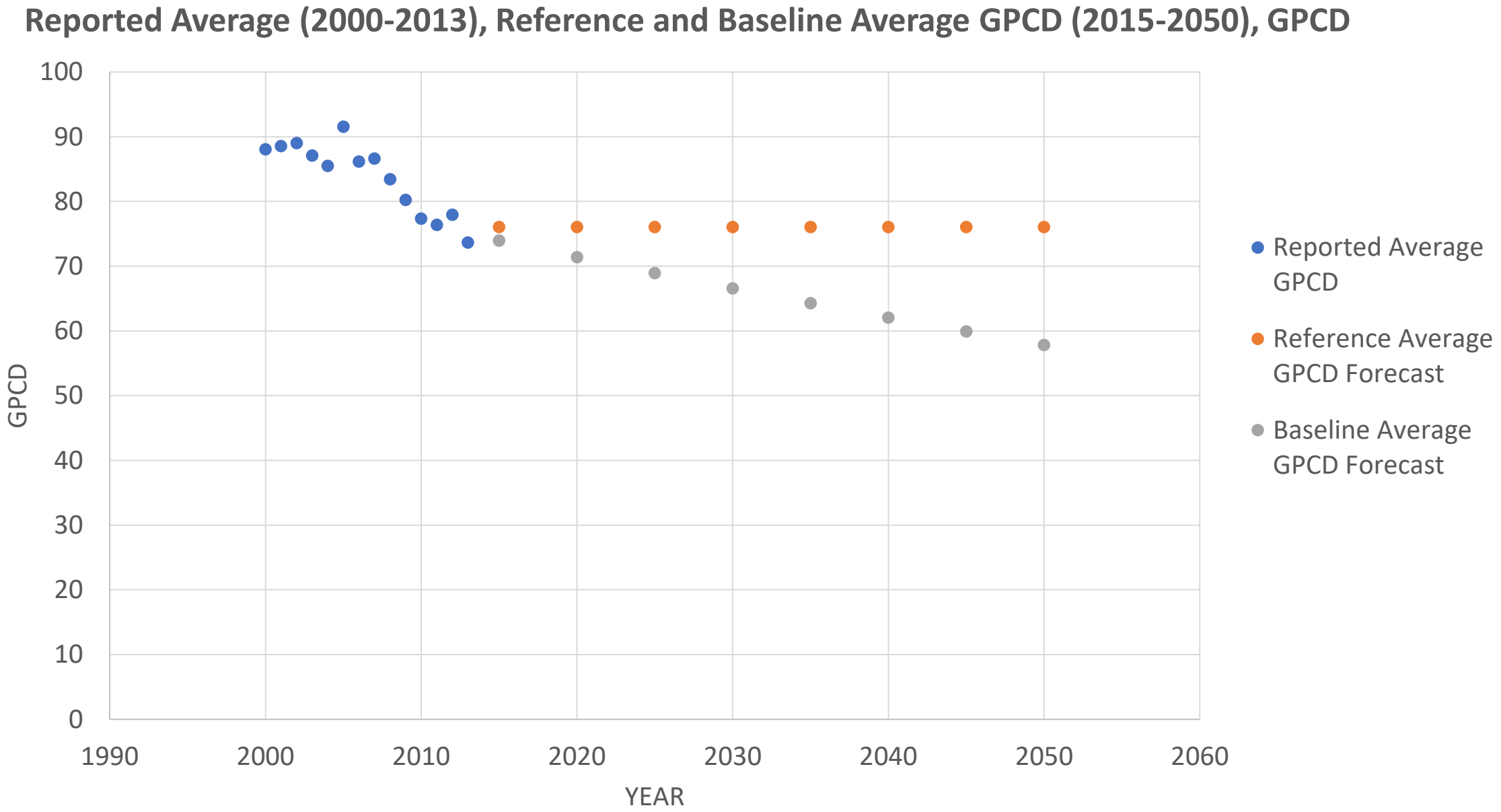


Residential Municipal-Scale Water Supply (CWS & PWS)

Reported residential withdrawals (2000-2013), reference and baseline forecast (2015-2050), MGD

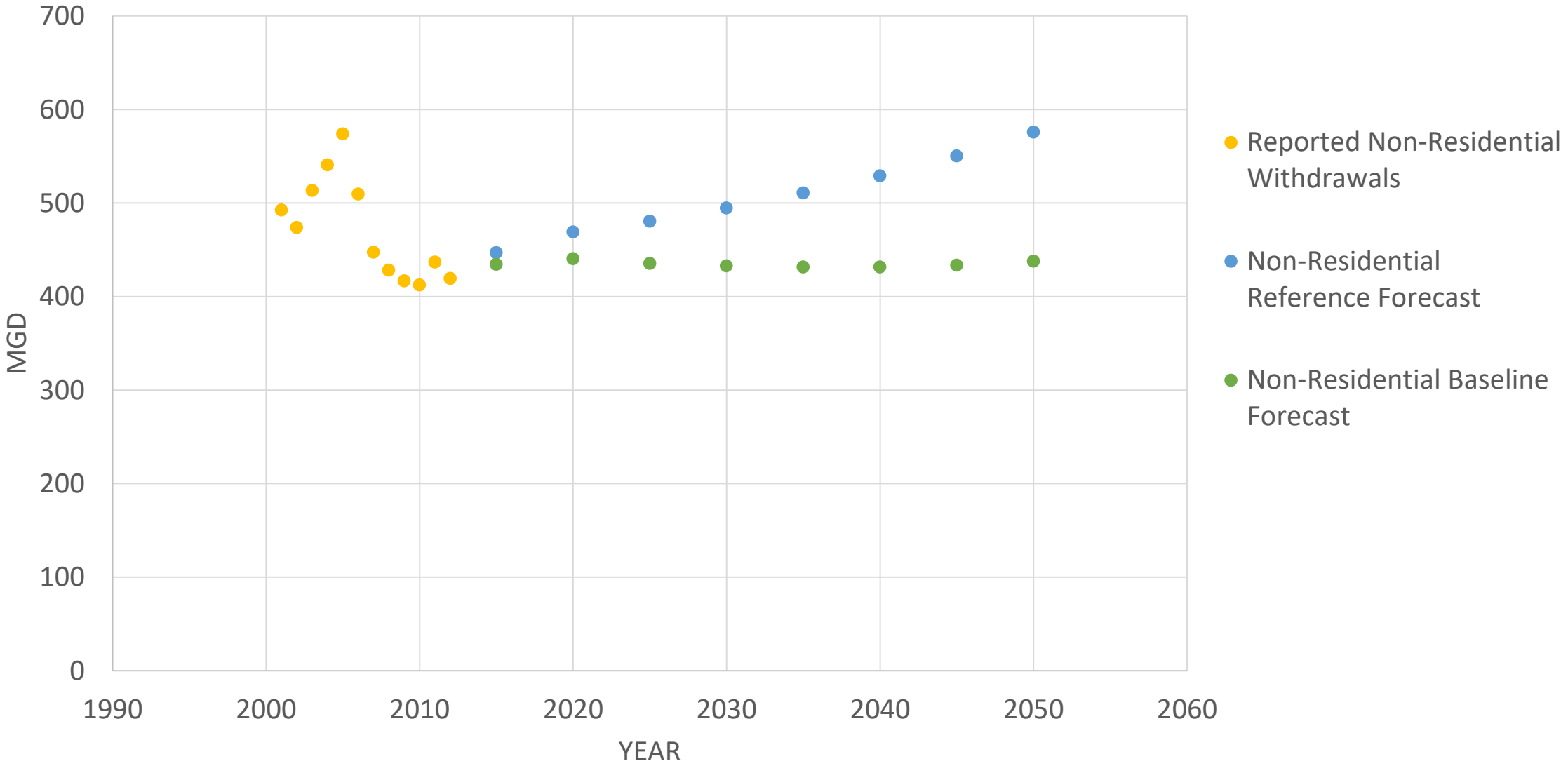


Residential Municipal-Scale Water Supply (CWS & PWS)



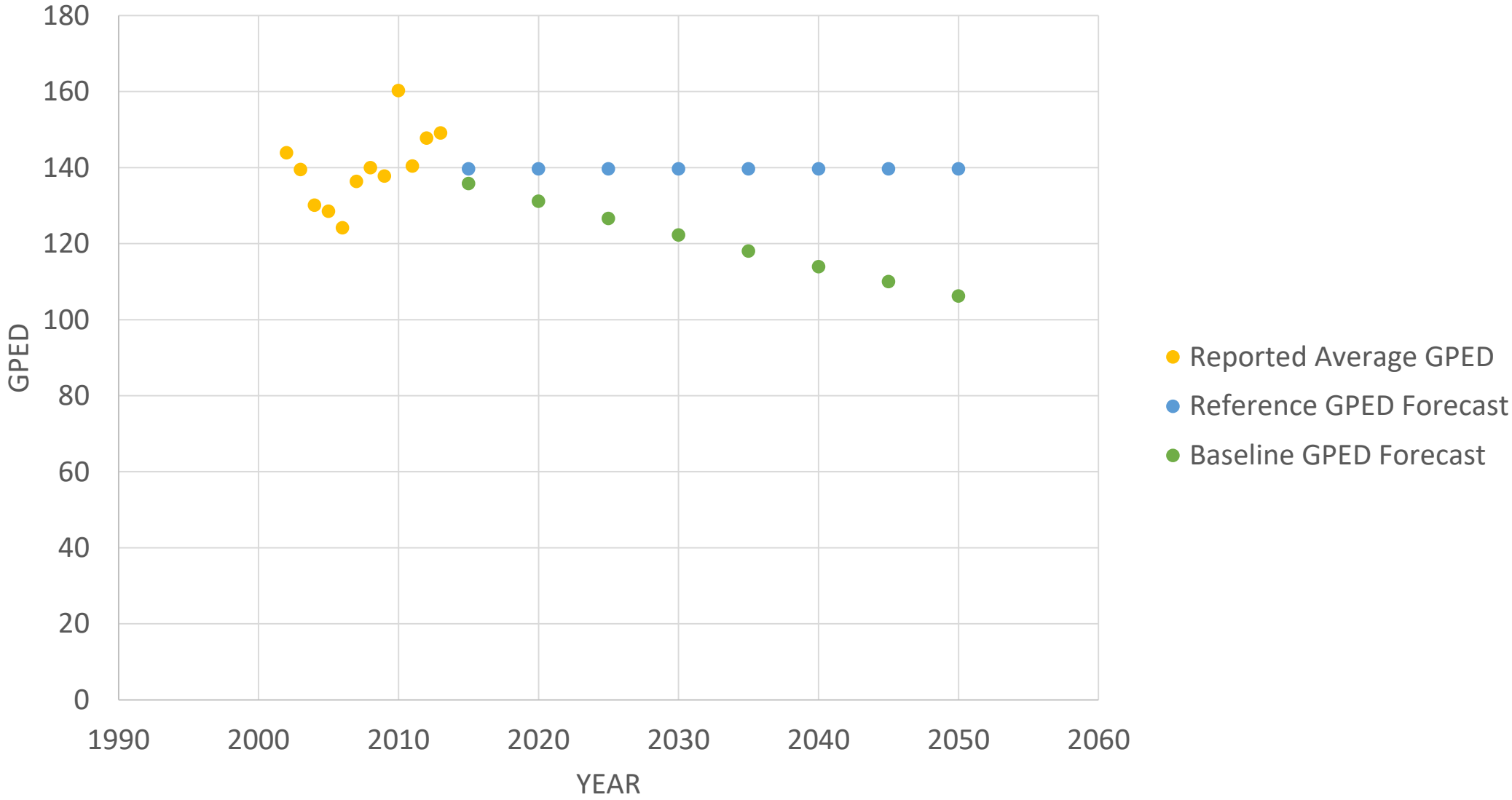
Non-Residential Municipal-Scale Water Supply (CWS, PWS, I&C SS)

Reported non-residential withdrawals (2002-2013), reference and baseline forecast (2015-2050), MGD



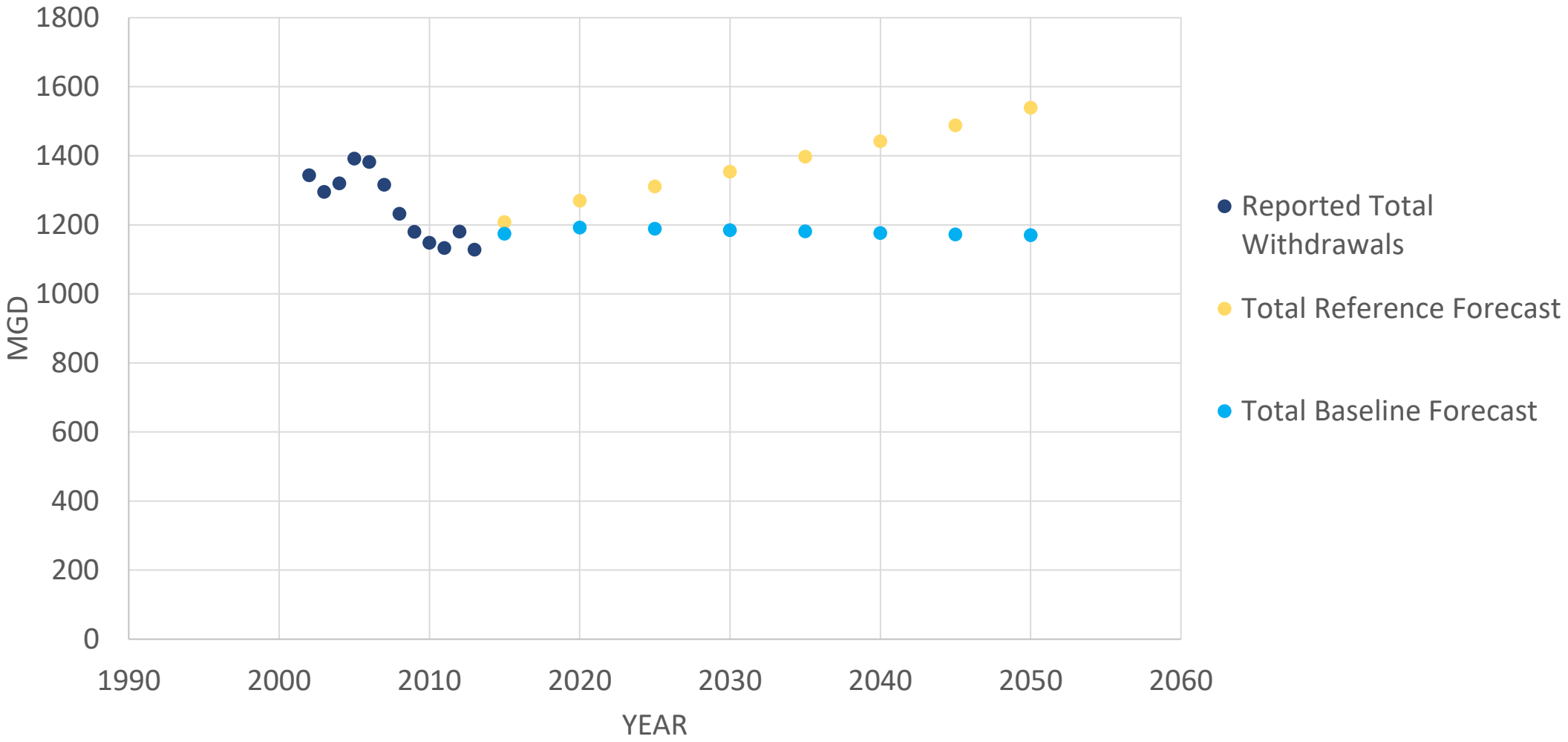
Non-Residential Municipal-Scale Water Supply (CWS, PWS, I&C SS)

Reported Average GPED (2000-2013), Reference and Baseline Average GPED (2015-2050)



Total Municipal-Scale Water Supply (CWS, PWS, I&C SS)

Reported withdrawals (2000-2013), reference and baseline forecast (2015-2050), MGD



Format of the results

Scale

- Region
- County
- Municipality (~245)

Sector

- Residential
- Non-residential
- Domestic self-supply

Source

- Lake Michigan
- Shallow aquifers
- Sandstone aquifers
- Fox River
- Kankakee River

Spreadsheet

Data for each municipality or the county remainders:

- Provides the historical data on annual water withdrawals, and other variables used in the forecast
- Provides the forecast equations

Potential users of the forecast

Long-range forecast for planning purposes (water & land use)

- Provide water demand information at the municipal scale, for incorporation in planning efforts
- Provide inputs to Lake Michigan allocation, groundwater flow model, and other source assessment analysis
- Others?

Next steps

- Finalize forecast based on **draft** ON TO 2050 Socioeconomic forecast in June

- Finalize based on **approved** ON TO 2050 Socioeconomic forecast in October

Comments, questions?

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