Updated Approach

2050 Water Demand Projections

METROPOLITAN COUNCIL

January 9, 2024 | Greg Johnson and Dan Marckel

Recap on Purpose of Demand Projections

Support Regional and Subregional Planning

The Met Council water demand projections are intended to:

1. Provide guidance for communities as they develop content for the water supply plan section of their comprehensive plan.
2. Help Met Council planners and policy makers, state agencies, and community planners to plan for future growth and address regional issues. These projections can help us understand where future water demand might bump up against, or exceed existing capacity - or where there is plenty of capacity to support growth.
3. Provide subregional and regional water demand data for Met Council's groundwater modeling projects, surface water analyses, and other studies.
4. Compare wastewater discharge volumes from each community to wintertime water use.
5. Estimate projected water use for each of Met Council's wastewater treatment plant sewersheds.
6. Review impacts from employment water demands.

Previous Proposed Approach: Projection of 2050 Municipal Water Demand

Use the average historical water use per capita demand and Met Council's population forecasts, including exploration of uncertainty with four different development scenarios, to represent a range of possible future (2050) water use as follows:

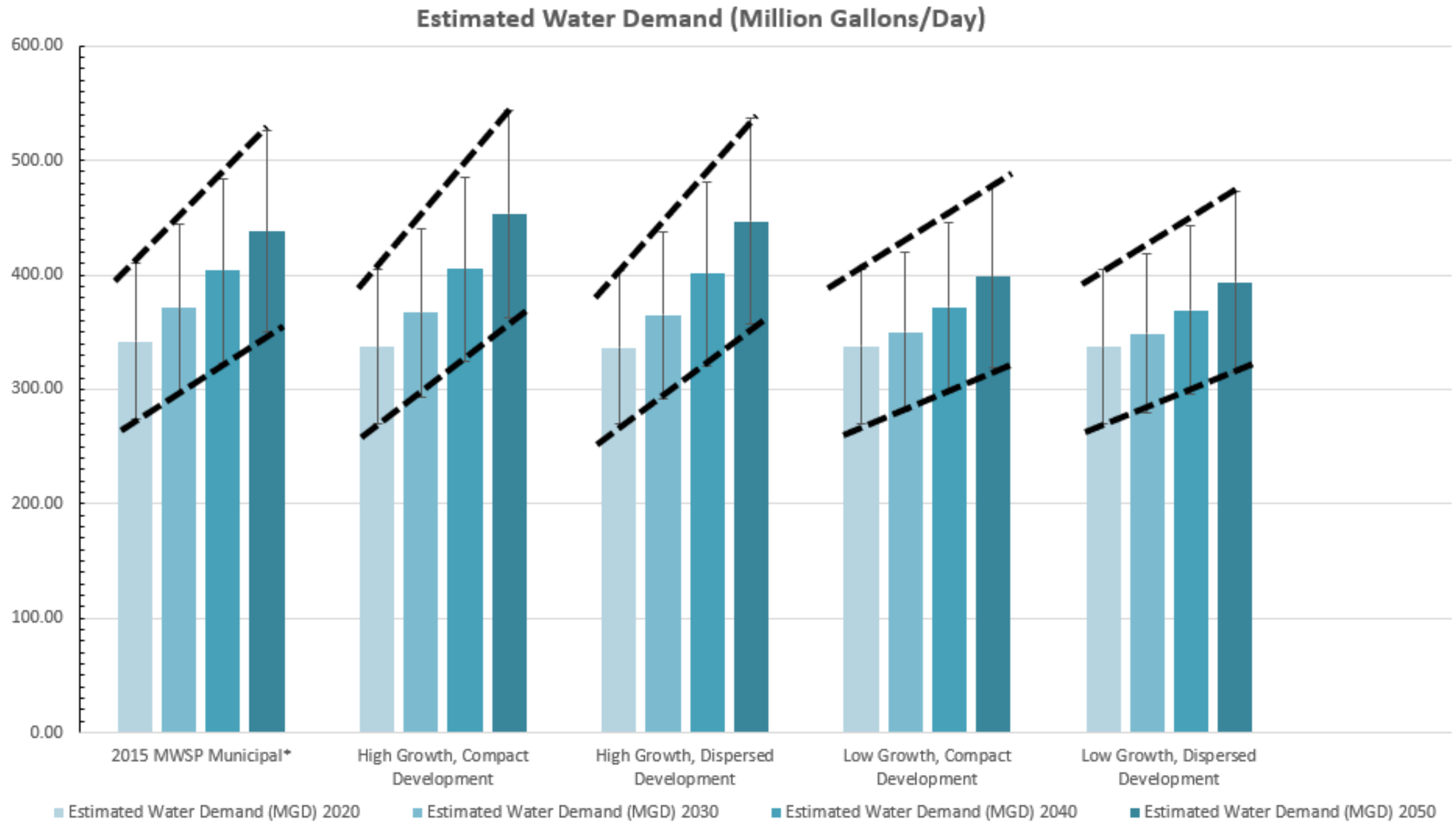
Projected Municipal Water Use = [Projected Population by Regional Growth Planning Scenario*]

x [Per Capita Water Use] with a Variable Range (+/- 20%)

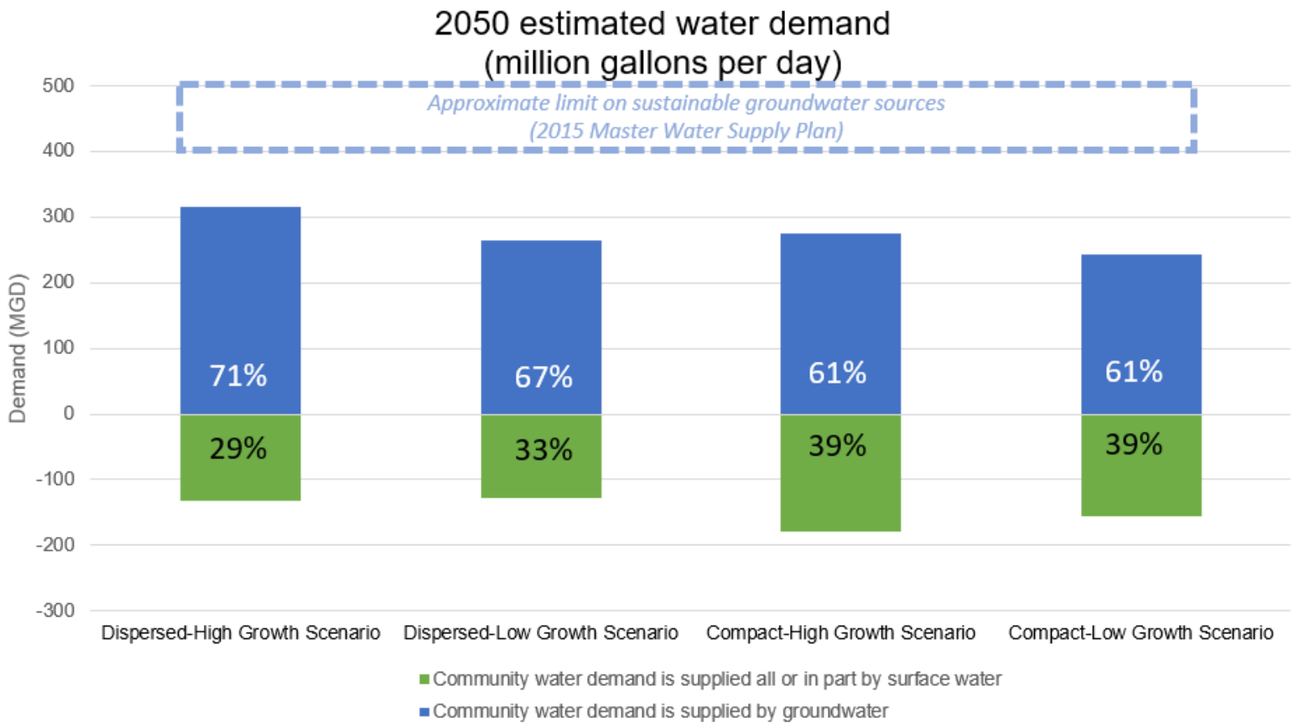
The four development scenarios include:

1. **High growth with compact development**
2. **High growth with dispersed development**
3. **Low growth with compact development**
4. **Low growth with dispersed development**

Preliminary Results Proposed Approach vs. 2015 MWSP Demand – Summer 2023 Meetings



Preliminary Results of Original Proposed Approach: Water Demand by Source – Summer 2023 Meetings



Dispersed growth scenarios:

- More groundwater than surface water use, bringing us closer to limits of groundwater sustainably
- More pressure to provide water through additional private wells in areas not served by municipal systems

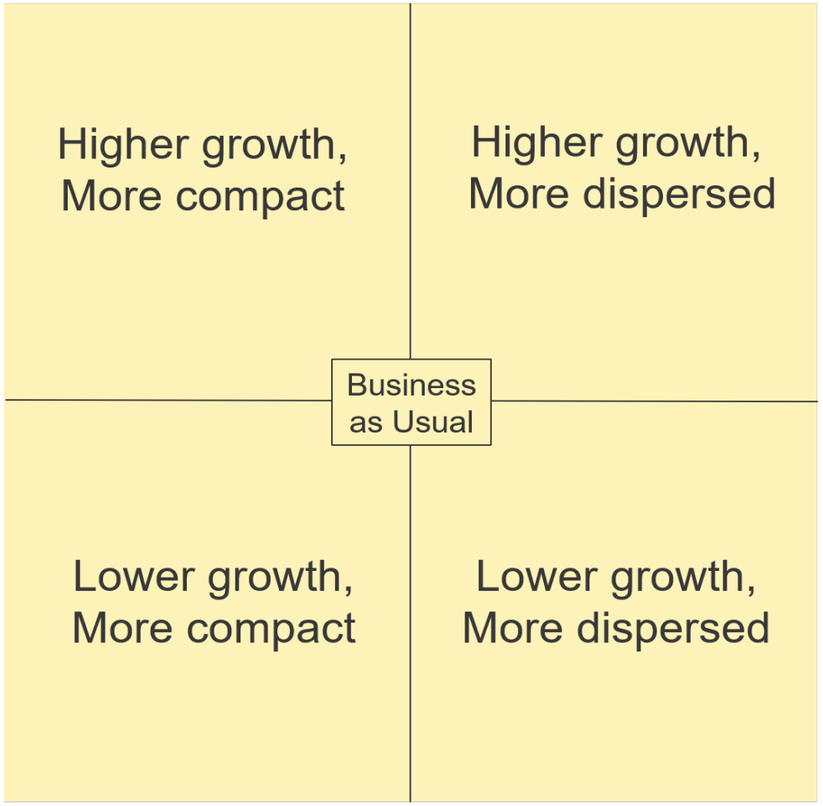
Compact growth scenarios:

- Increased use of existing surface water systems (Mississippi River), which currently has higher monitoring requirements, treatment, and costs.
- Higher risk of impact from sudden drought.

High growth versus low growth scenarios:

- More pressure to expand or create new public and private water supply systems

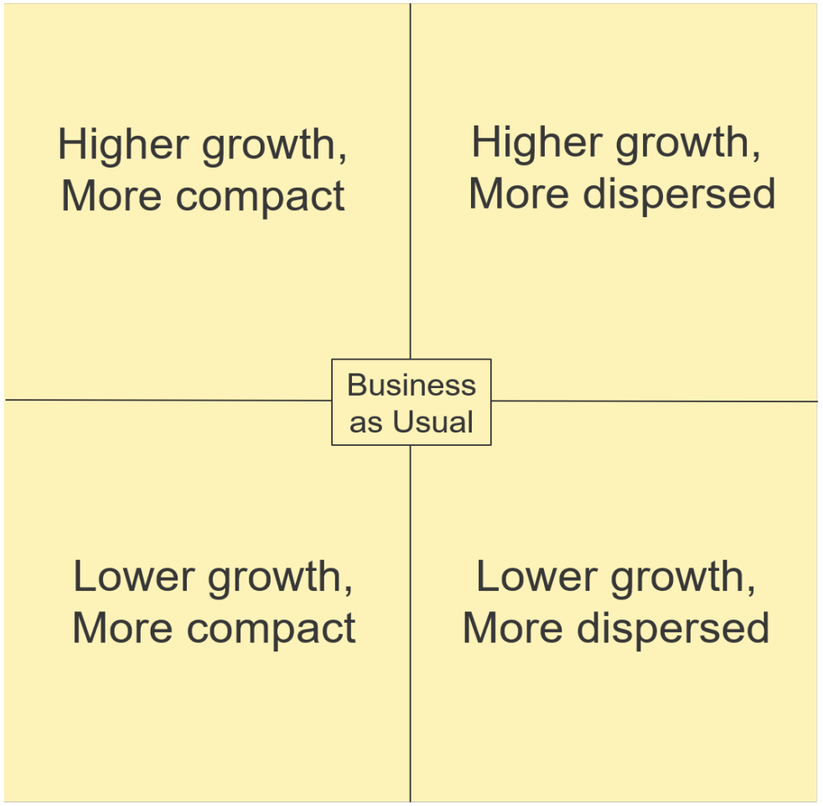
Notes on growth scenarios (1/2)



Scenario Framework

- A technique to make Imagine 2050 decisions in the face of future uncertainties.
- A shared framework for every Council policy team to stress-test their area of responsibility.
- A “tepid” range limited to:
  - adopted comp plan parameters
  - growth ranges we’ve previously seen
- Issues like climate change or telecommuting are factored in as growth effects and locational decisions
- Extraordinary events (major climate change, economic depression, new pandemics, meteor strikes) are **not** incorporated.
- Findings: relative lessons about our future; guidance to shape land use decisions, new policy alignments

Notes on growth scenarios (2/2)



Do the growth scenarios need to appear strongly in the Regional Water Supply Plan?

Pros

- Findings confirm that water supply planning is done well.
- The list of factors is more robust than water calculations alone.
- Including the scenarios work could give more assurance to readers.

Cons

- It looks complicated; hard to communicate?
- A new technique may be less supported?

Options

- Simplify how scenarios are included in charts
- Include appendix or references to the scenarios

Updated Approach:
Projection of 2050 Total Water Demand

Total Metro Region Water Demand =

Projected Municipal Water Use +
Projected Private High Capacity Well Use

Previous Approach:
Projection of 2050 Municipal Water Demand

Use Met Council's population forecast for each community, the average per capita demand from 2012-2021 for each community, and a variable range to represent a range of possible future water use as follows:

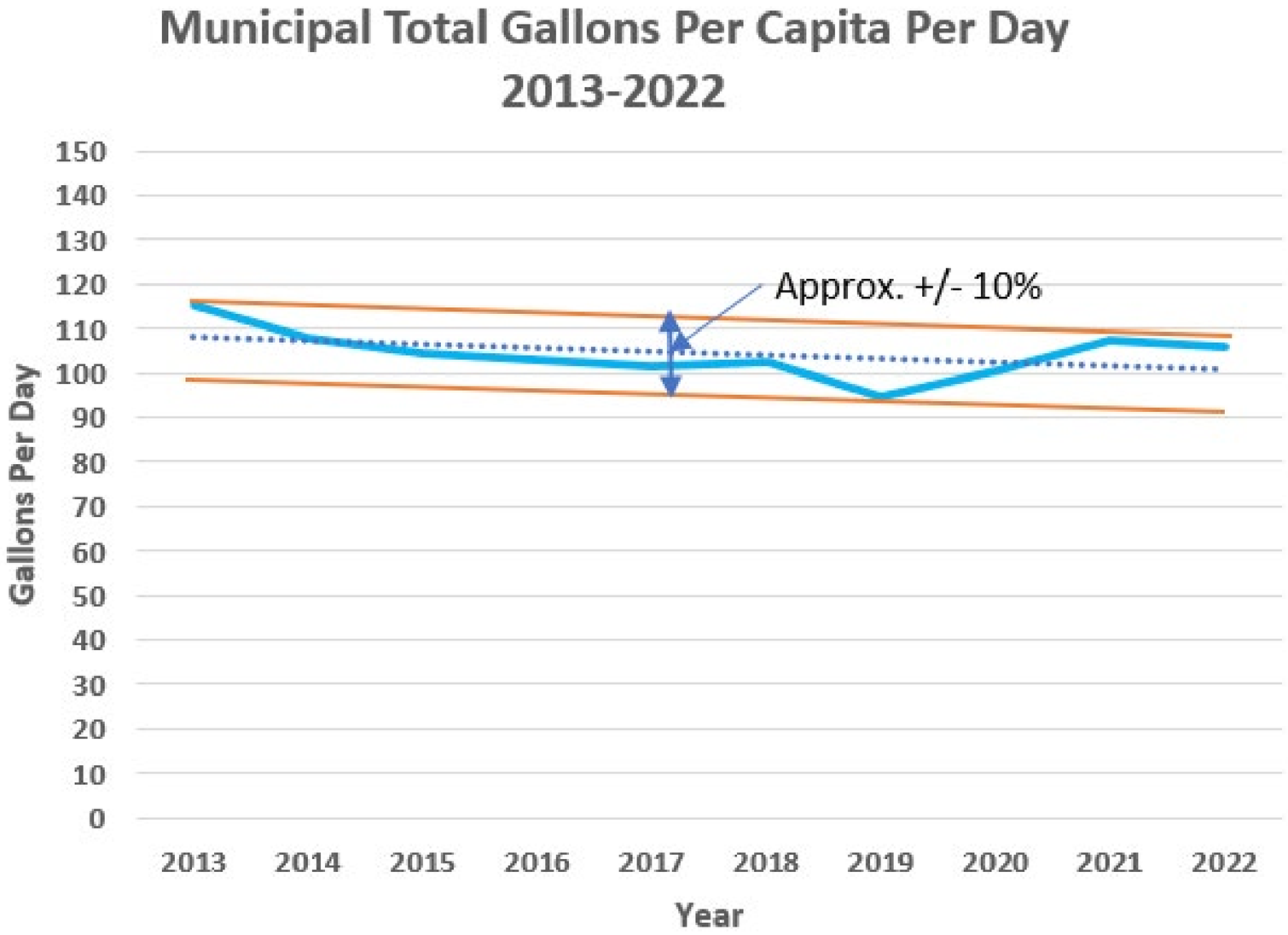
Projected Municipal Water Use = [Projected Water Service Population]

x [2012-2021 Average Total Per Capita Water Use] with a Variable Range (+/- 20%)

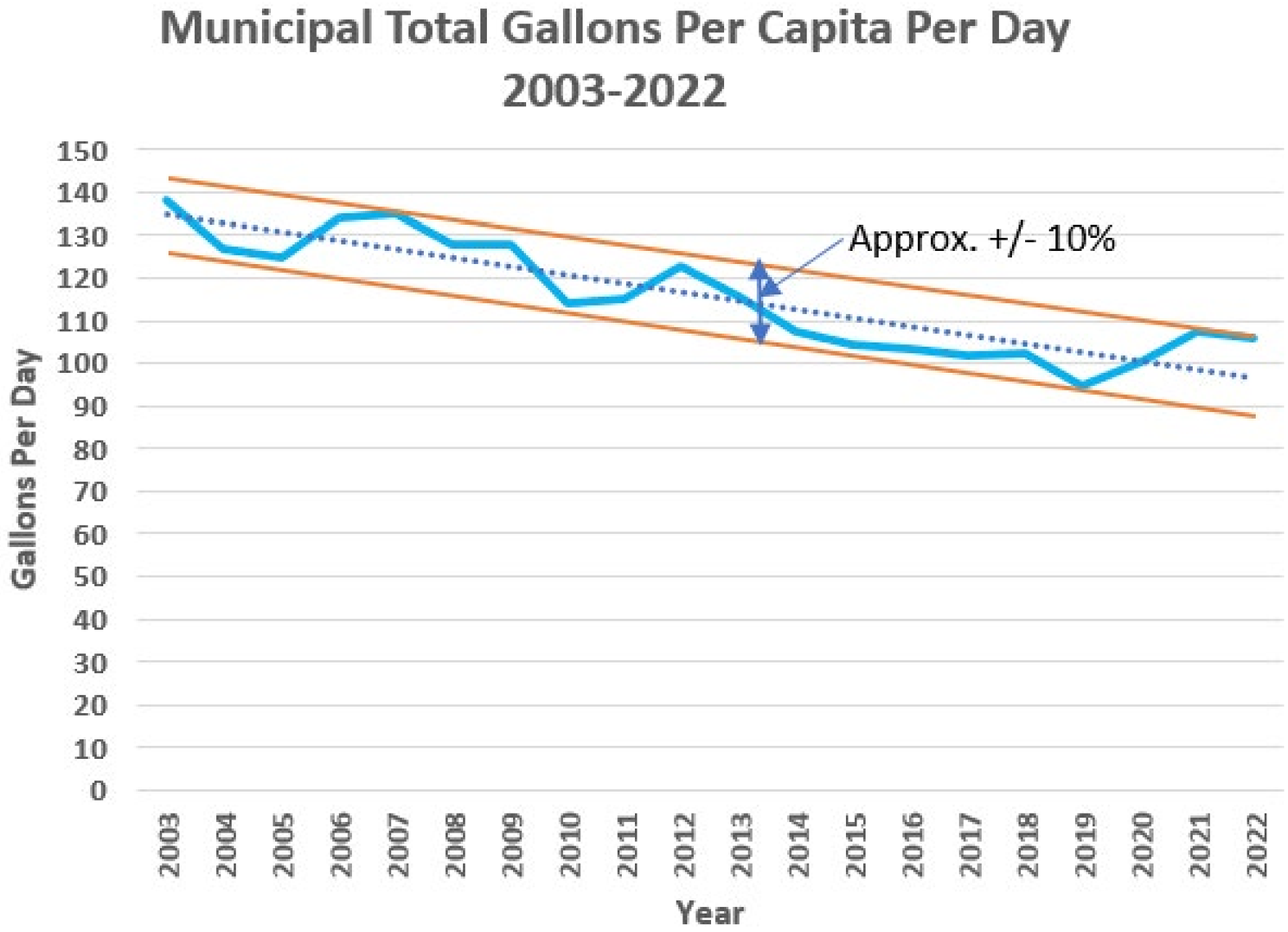
Updated Approach:
Projection of 2050 Municipal Water Demand

Year	Previous 2012-2021 Total GPCD (Total Use/Service Population)	Updated 2013-2022 Total GPCD (Total Use/Service Population)	2018-2022 Total GPCD (Total Use/Service Population)
2012	127.65		
2013	115.72	115.49	
2014	108.04	107.66	
2015	104.35	104.27	
2016	104.17	103.11	
2017	103.13	101.72	
2018	103.83	102.46	102.46
2019	95.14	94.78	94.78
2020	100.26	100.31	100.31
2021	106.92	107.43	107.43
2022		105.81	105.81
Range	95.14-127.65	94.78-115.49	94.78-107.43
Average (2012-2021)	**106.92**		
Average (2013-2022)		**104.30**	
Average (2018-2022)			**102.16**

Variable Range Analysis (2013-2022)



Variable Range Analysis (2003-2022)



Variable Range Analysis

Examples of communities with historical water use (2012-2023) that exceeded a variable range greater than +/-10% include:

City of White Bear Lake	+/-14.2%
City of Lexington	+/-22.2%
City of New Germany	+/-17.1%
City of South St. Paul	+/-33.8%

Potential reasons to use greater than +/-10% include changes in industry, drier and wetter years, and rapid and unforeseen residential growth.

Variable Range Analysis Recommendations

Recommendations:

1. Use a variable range of +/-10% when looking at the combined metro region water use as a whole.

2. Use a variable range of +/-20% when thinking about water use for individual communities to account for extreme weather patterns and rapid and unforeseen industrial, residential, and commercial growth for water system planning and adjusting water utility rates.

Water Supply Plan Demand Data – Municipal Water Systems

Community	2013-2022 Average Per Person Water Use (gpcd)	2030				2040				2050			
		Projected Water Service Population	Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)	Projected Water Service Population	Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)	Projected Water Service Population	Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)
X													
Y													
Z													

Water Supply Plan Demand Data – Private High Capacity Wells

Private High Capacity Well Owner	2013-2022 Average Annual Percent Increase	2030			2040			2050		
		Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)	Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)	Annual Projected Water Demand (gallons per year)	Variable Range +/-10% (gallons per year)	Variable Range +/-20% (gallons per year)
X										
Y										
Z										

Updated Approach: Projection of Water Demand

Total Annual Water Demand (Year) =

Projected Municipal Water Use = [Projected Water Service Population]
x [2013-2022 Average Total Per Capita Water Use]
with a Variable Range (+/-10 and +/-20%)
+
Projected Private High Capacity Water Use = [2022 Total Water Use]
x [2013-2022 Average Annual Percent Increase Water Use] x Years
with a Variable Range (+/-10 and +/-20%)

Next Steps

- Obtain final 2050 population forecasts from Met Council's Research staff and coordinate water service populations with MCES' Wastewater planning staff.
- Calculate water demand projections to year 2050.
- Complete other water demand analyses (ex. compare to wastewater flows, analyze water demands by individual wastewater sewershed areas, analyze employment demand projections, etc.)