



Georgia's  
**State Water Plan**

Municipal and Industrial Water and  
Wastewater Demand Forecasting  
Methodology

[www.georgiawaterplanning.org](http://www.georgiawaterplanning.org)

# Water Demand Forecasting

## Water Use Categories

- Agricultural – Forecasted by UGA
- Energy – Needs forecasting by EPD with assistance from energy companies
- **Municipal** – Including Residential, Commercial, and Light Industrial Water Use
- Industrial – for Major-Water Using Industries Only

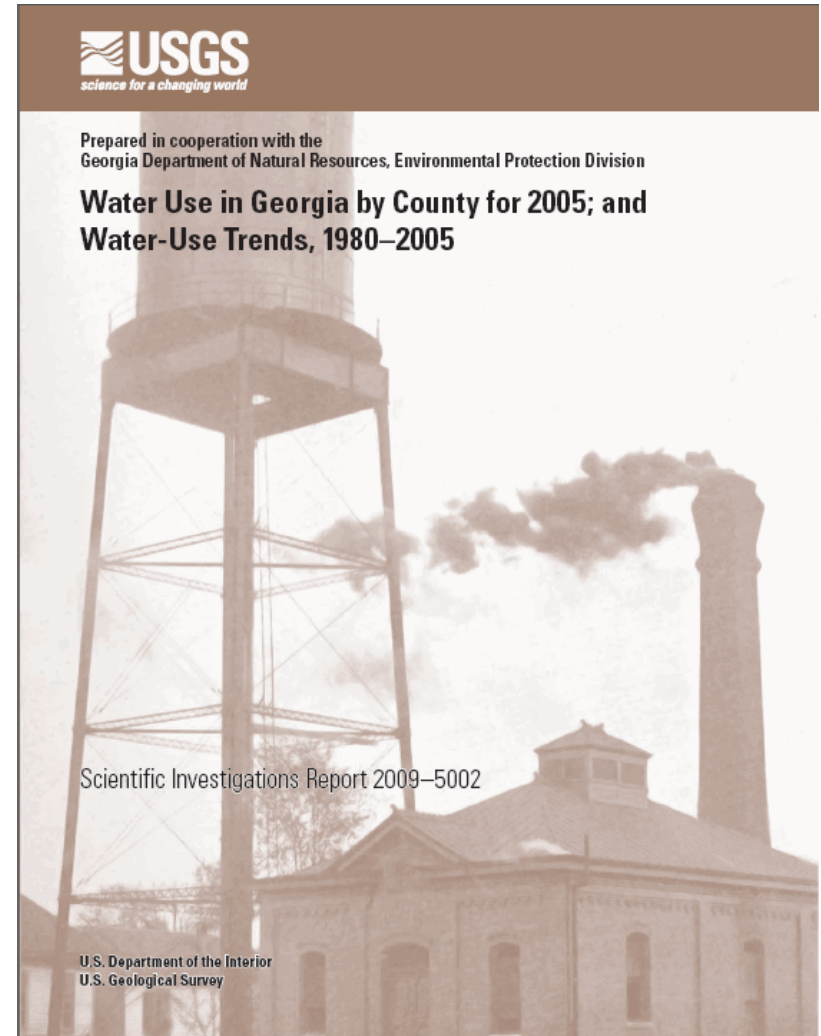
# Forecasting Introduction

## Forecasts are:

- Based on the continuation of current trends and practices into the future
- Excluding any new management practice that may alter demands
- Not intended to establish the efficiency of water use
- Basis for regional water planning, not for making individual permit decisions

# Municipal Water Use Data Sources

- "*Water Use in Georgia by County for 2005 and Water-Use Trends for 1980-2005*", by Fanning, J.L., and Trent, V.P.USGS, 2009
- EPD Withdrawal Permit Records (2002-2008)
- Rainfall Data from NOAA Southeast Regional Climate Center
- US Census Age of Housing Units (2007)



# Projecting Municipal Water Demand

Future Water Need:



# Future Population

## Future Population

- Status of Population Projections
  - 600+ Comments received on the draft population projections
  - OPB will provide responses to each comment
  - OPB and CVIOG are currently revising the population projections to incorporate the comments
- Council Input – Region Specific Factors
  - Opportunity to examine different scenarios
  - May select the scenario(s) that will be used to forecast municipal water demand
  - Public or Self-Supply

# Region-Specific Factors

## Region Specific Factors

### Council Input – Region Specific Factors

- Impacts of Transient Population Changes
  - Already included in local water use rate
  - Specific changes may be made with information about
    - Military Bases
    - Universities
    - Seasonal Tourism
- Weather Adjustments
  - Compare annual rainfall to long-term annual average
  - If 2005 was a wet year, 2004 or 2006 may be evaluated

# Per Capita Water Demand

Base Year  
Per Capita  
Water  
Demand

## Council Input – Region Specific Factors

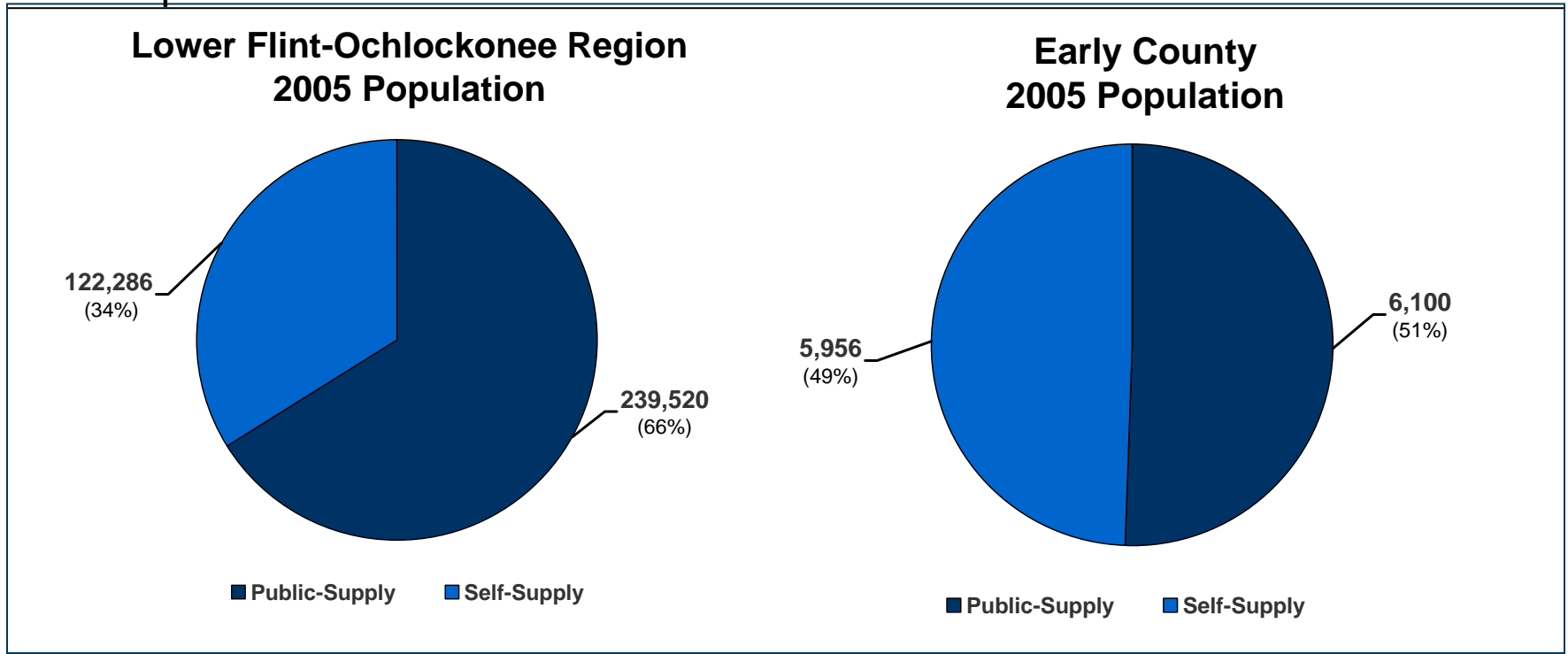
- Proposed per capita range
  - 75 to 175 gpcd
- Factors to adjust per capita by county
  - Wholesale customers/suppliers
  - Direct customers outside of the county
  - Municipally-supplied large industries



# Types of Water Supply

- Public-Supply
  - public water systems
  - private water providers
- Self-Supply
  - provided by users

Example:



# Calculating Per Capita Demand

- Municipal
  - public/private water systems
  - adjustment for wholesale and large industrial
- Self-Supply
  - 75 gpcd demand
  - Council feedback for region specific adjustment



# Future Self-Supplied Water Demand

## 3 Scenarios for Initial Forecast of Future Self-Supply

1. Current Municipal/Self-Supplied ratio constant
2. Historical Municipal/Self-Supplied ratio trend continues
3. Custom Municipal/Self-Supplied ratio based on Council feedback

# Projecting Self-Supplied Water Demand

Future Self Supplied Water Demand:



# Plumbing Code Efficiency Savings

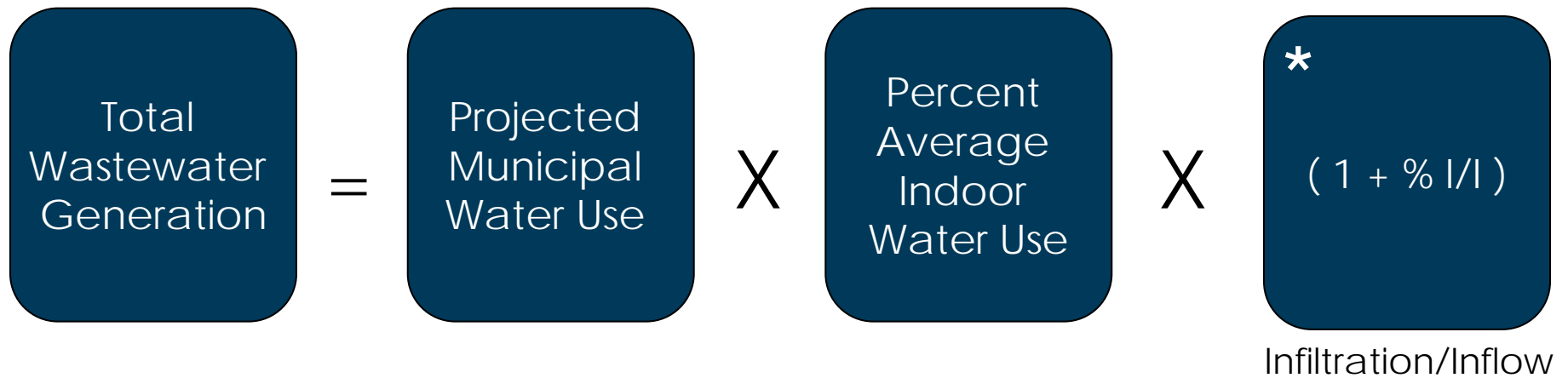
- 1992 National Energy Policy Act (NEPAct) mandated use of 1.6 gallon per flush toilets
- Savings from replacement of older toilets due to plumbing code efficiencies
  - Specific to each county based on Census Age of Housing Data
  - Per Capita Adjustment
  - 2% annual replacement rate



# Wastewater Generation Forecast

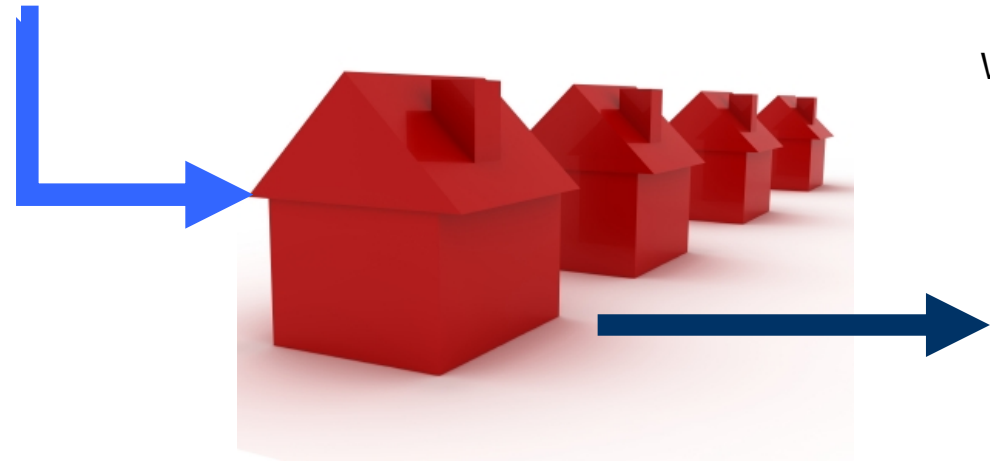
- Return flows are an important consideration in resource assessments
- Understand Water Returns
  - Quantity
  - Quality

# Municipal Wastewater Calculation



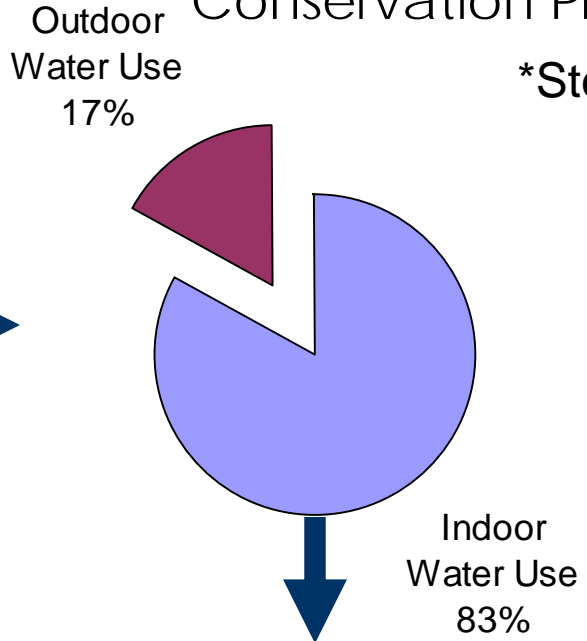
\* Water Planning Region specific values to be determined with Regional Councils

# Projected Municipal Water Use



# Georgia Water Use and Conservation Profiles Report

\*Stephens County



Average indoor water use

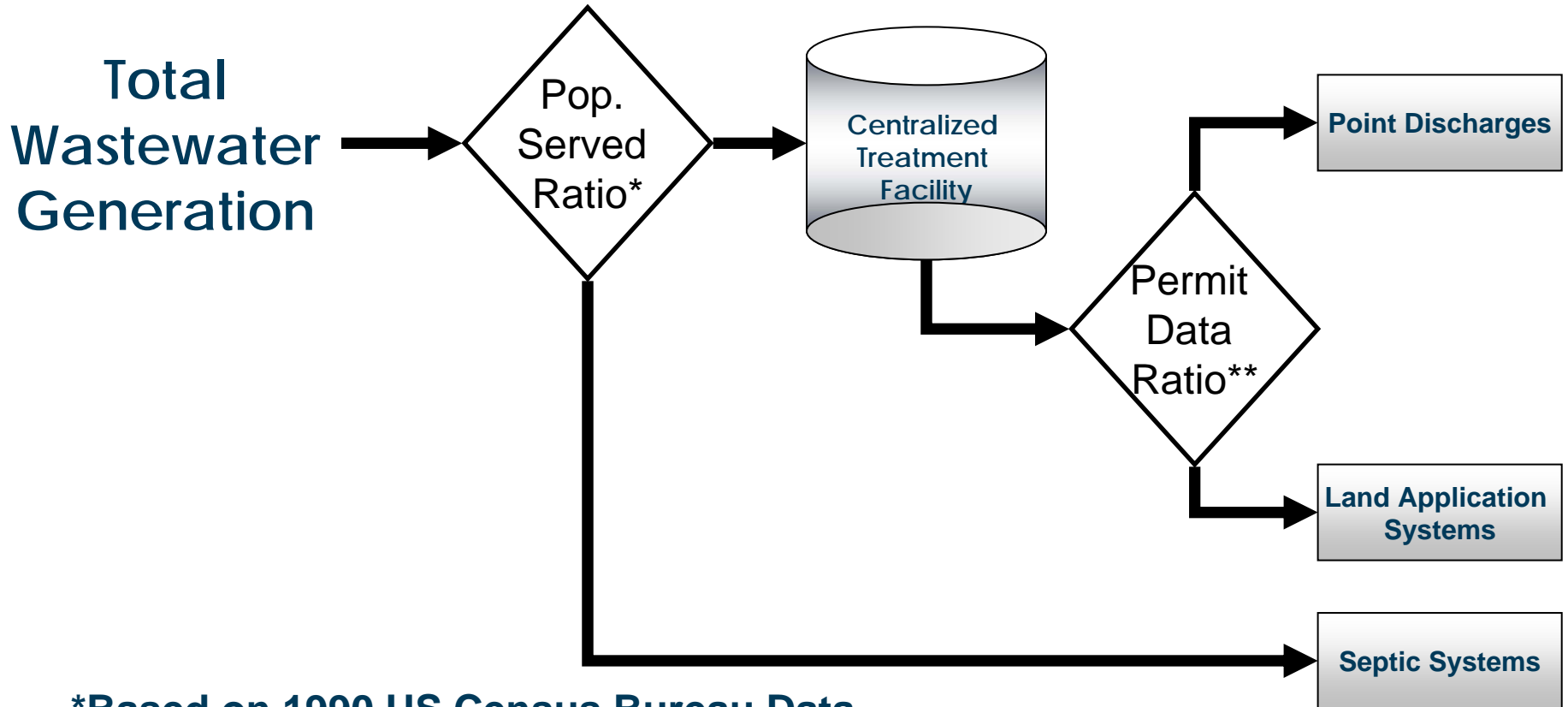


# Inflow and Infiltration (I&I)

- All sanitary sewer systems experience I&I
- Inflow is stormwater entering at points of direct connection
- Infiltration is groundwater entering through cracks and/or leaks
- Average I&I percentage estimated for each water planning region based on input from water users

$$\rightarrow \text{Avg. Indoor Water Use} + \text{I\&I} = \text{Total Wastewater Generation}$$

# Wastewater Discharges



\*Based on 1990 US Census Bureau Data

\*\*Based on Existing GA EPD Permit Data

# Water Demand Forecasting

## Water Use Categories

- Agricultural – Forecasted by UGA
- Energy – Needs forecasting by EPD with assistance from energy companies
- Municipal – Including Residential, Commercial, and Light Industrial Water Use
- **Industrial** – for Major-Water Using Industries Only

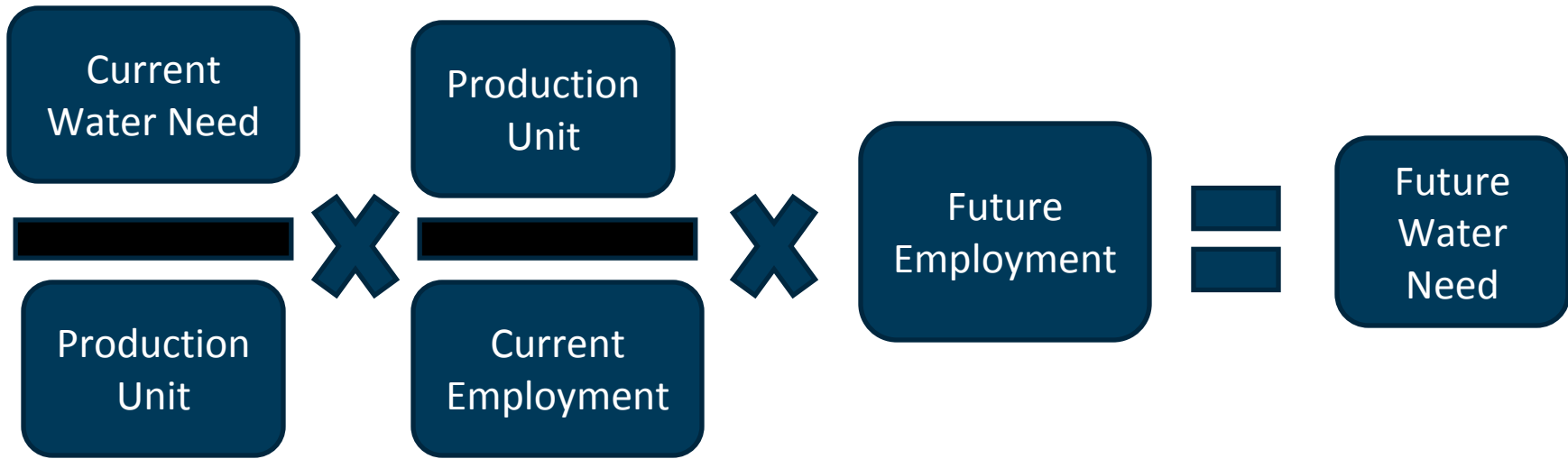
# Major Water-Using Industries in Georgia

Industry	SIC Code	NAICS Code	Industry	SIC Code	NAICS Code
Mining	14	212	Petroleum	29	324
Food	20	311	Rubber	30	326
		312			
Textiles	22	313	Stone and Clay	32	327
		314			
Apparel	23	315	Primary Metals	33	331
Paper	26	322	Fabricated Metal Products	34	332
Chemicals	28	325	Electric Machinery	36	335

# Industrial Water Needs

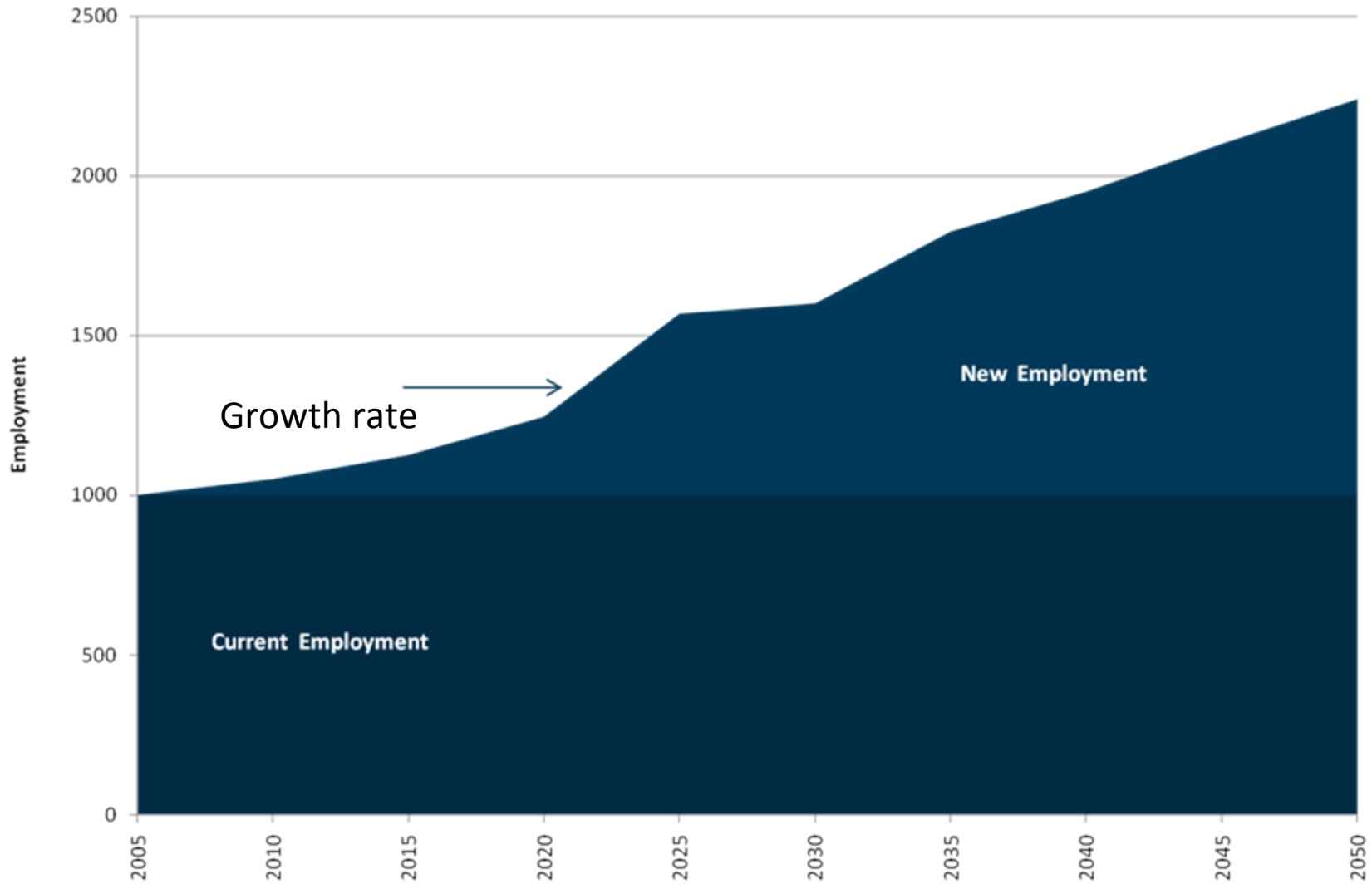
- Water is needed for industrial processes, sanitation, cooling and some domestic (employee) use
- Water need is linked to production, but production units are in multiple forms and often data are proprietary
- Employment is linked to production
- Employment data are available, thus often serves as a proxy for production information

# Water Needs and Employment Relationship

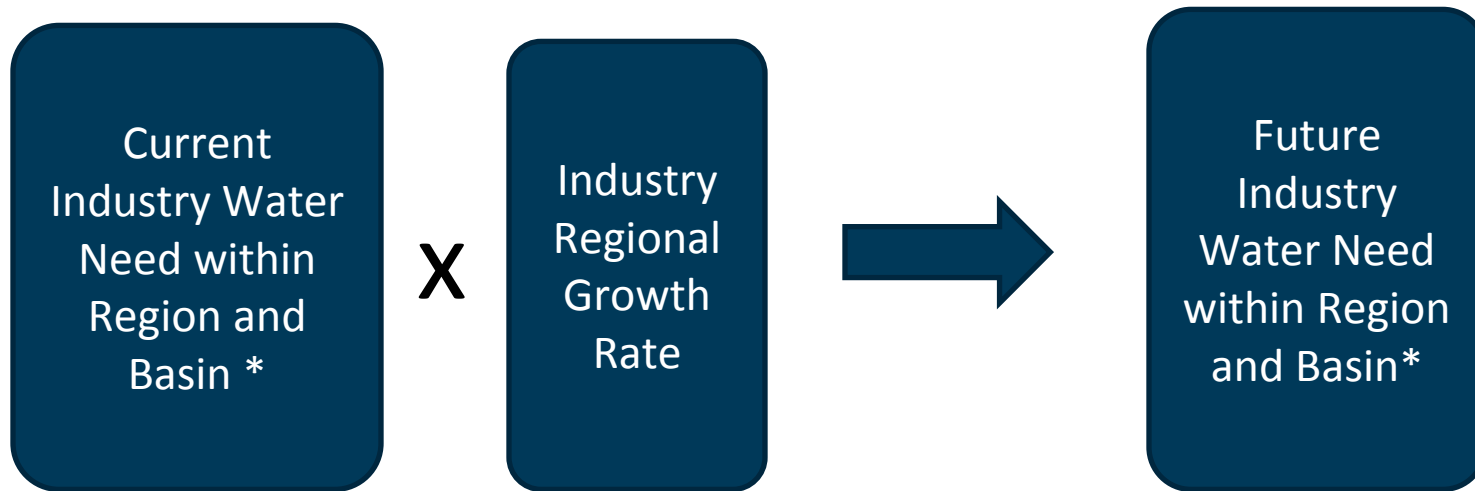


- Without production data, water need is a function of employment.
- If ratio of water need to employment is constant, then water need grows at the same rate as employment.

# Hypothetical Regional Industry Growth



# Water Need (Withdrawals) Increases at Employment Rate of Growth

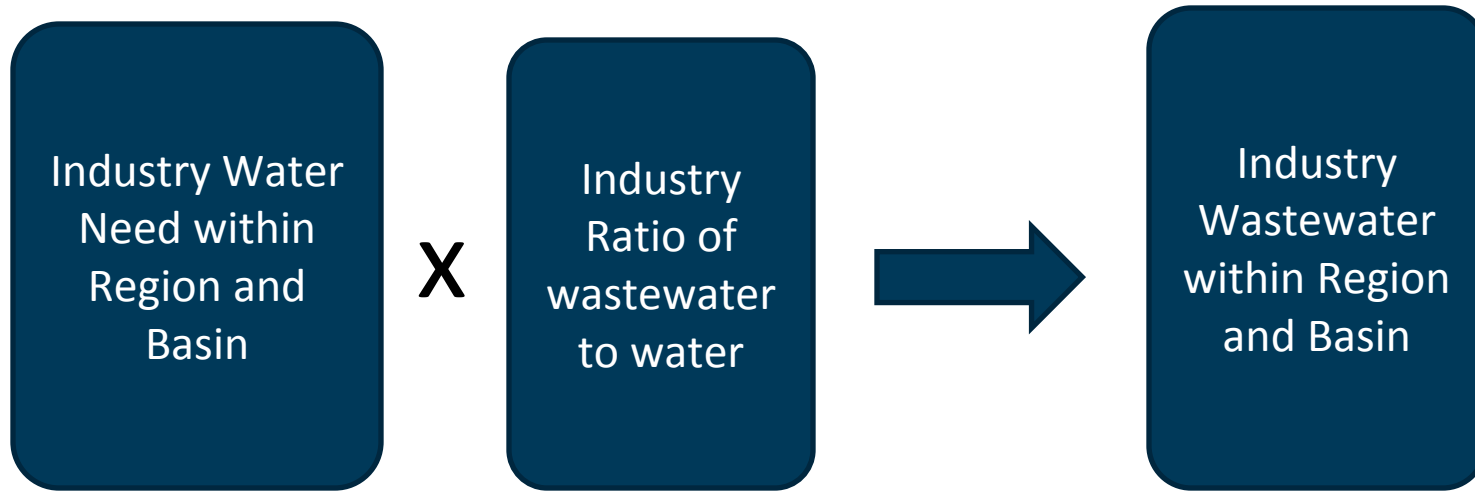


\* Or Aquifer

- Water need will remain constant if employment does not grow (i.e., water need will not decrease)
- The projection of future water need may be adjusted for industry production if adequate, credible data are publicly available



# Industry Wastewater



# Next Steps

- Region Specific input
  - Municipal
  - Industrial
- Draft water demand and wastewater flow projections presented for review and comment at Council Meeting 4