



# Water Demand Trends: Bellevue's Story

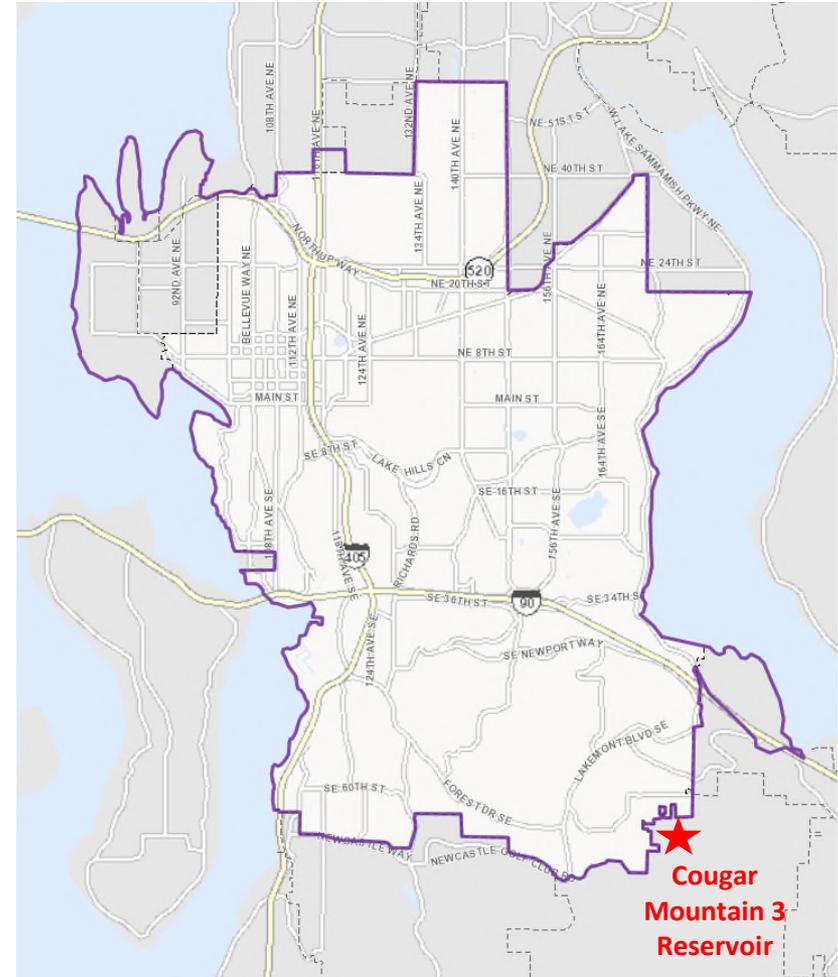
Doug Lane, P.E.

Bellevue Utilities Department

# Background



- Service Area
- 140,000+ Population
- 135,000+ Jobs
- 61 Pressure Zones
- 8 Municipalities
- Water supplied by Cascade (SPU)



# Cougar Mountain 3 Reservoir



- Built in 1997 to meet future growth
- 2.0 MG
- Serves Bellevue's highest zones
- Far southeast edge of system



# Cougar Mountain 3 Reservoir



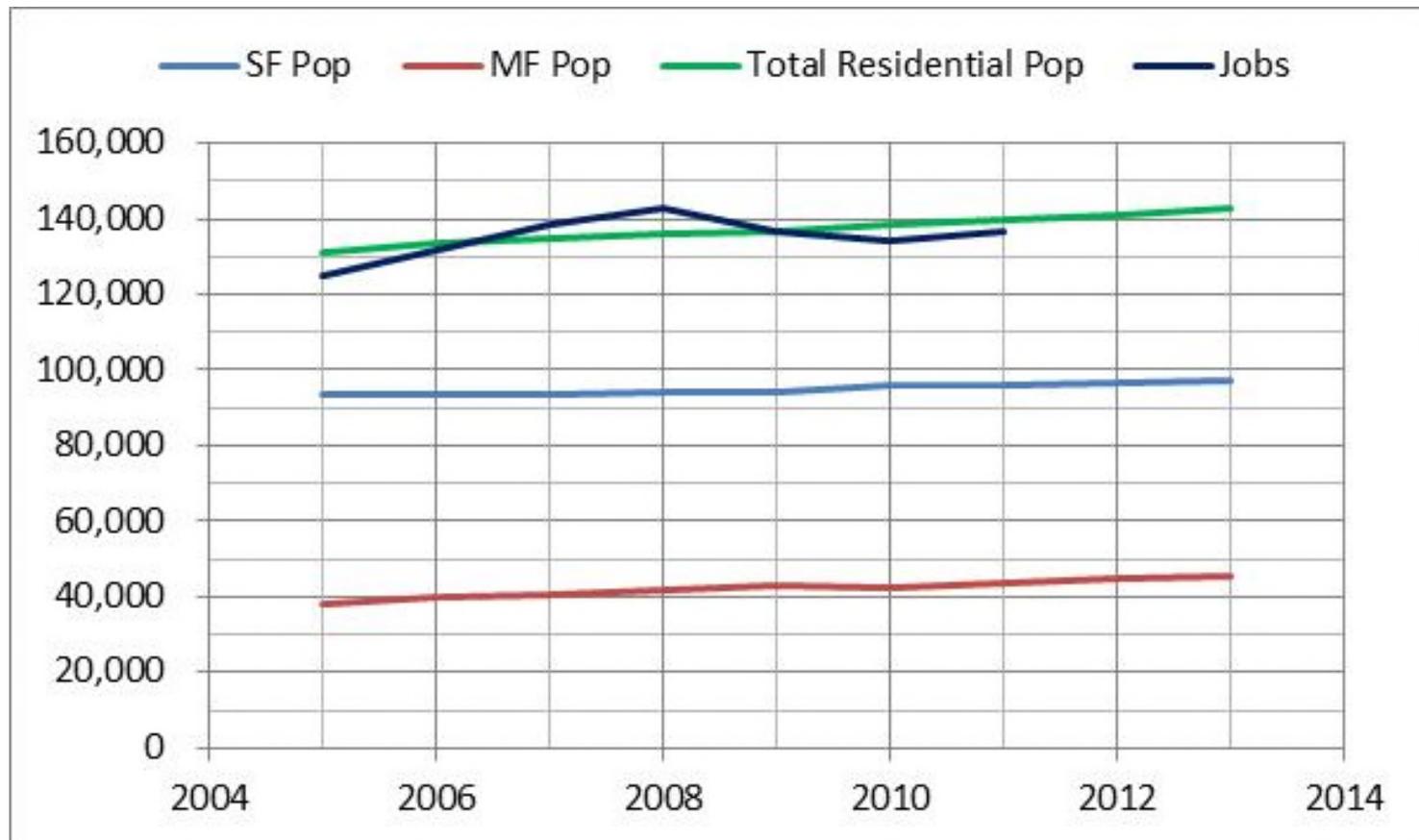
- 18 years later...
  - Struggle to maintain chlorine residual
  - Operated less than half full
  - Winter flushing to move water



# Recent Population Trend



Continued growth



# Recent Total Demand Trend



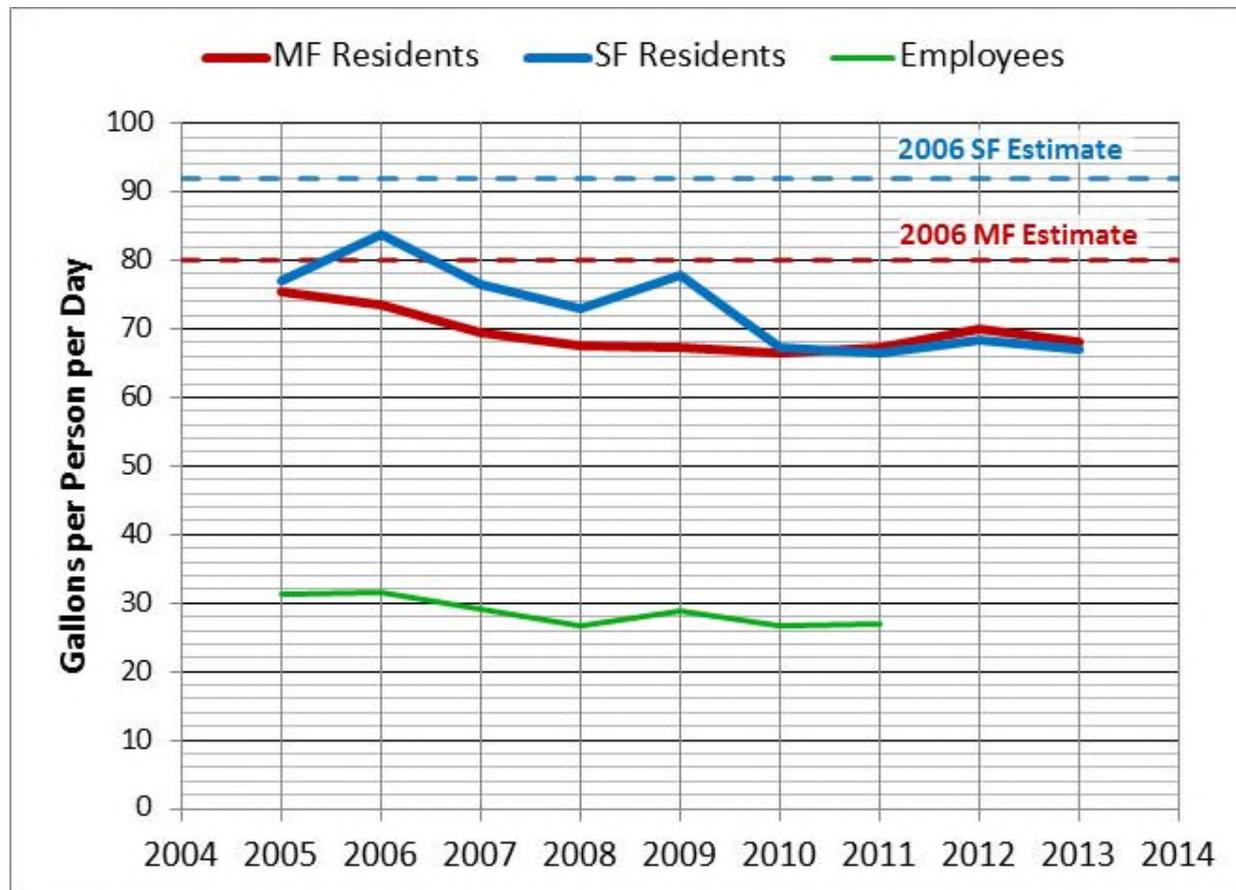
Continued  
*decline!*



# Projected vs. Actual Demand



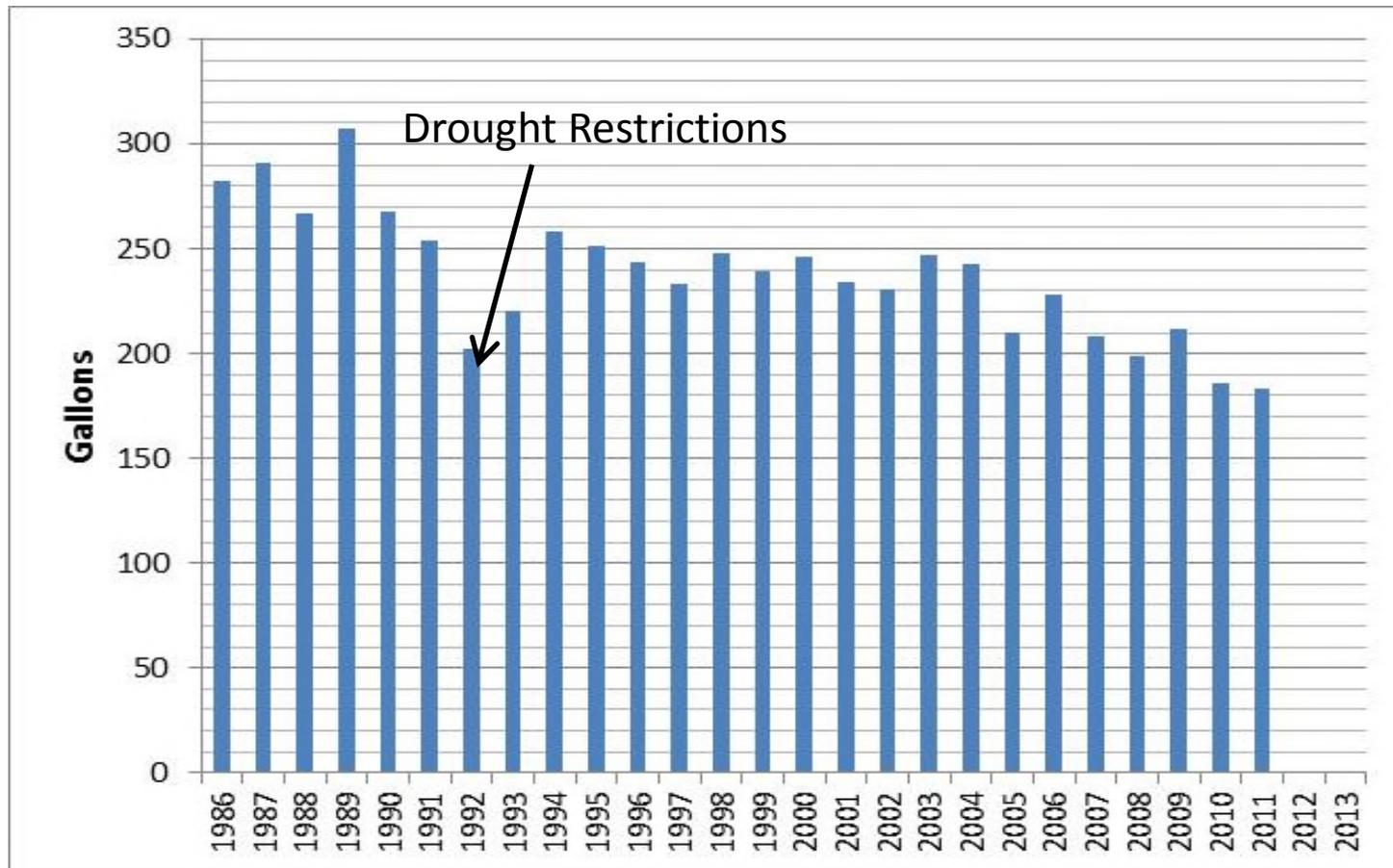
- Previous Assumptions no longer valid



# Long-Term Trend



- Single-Family Housing, gal/day per Account



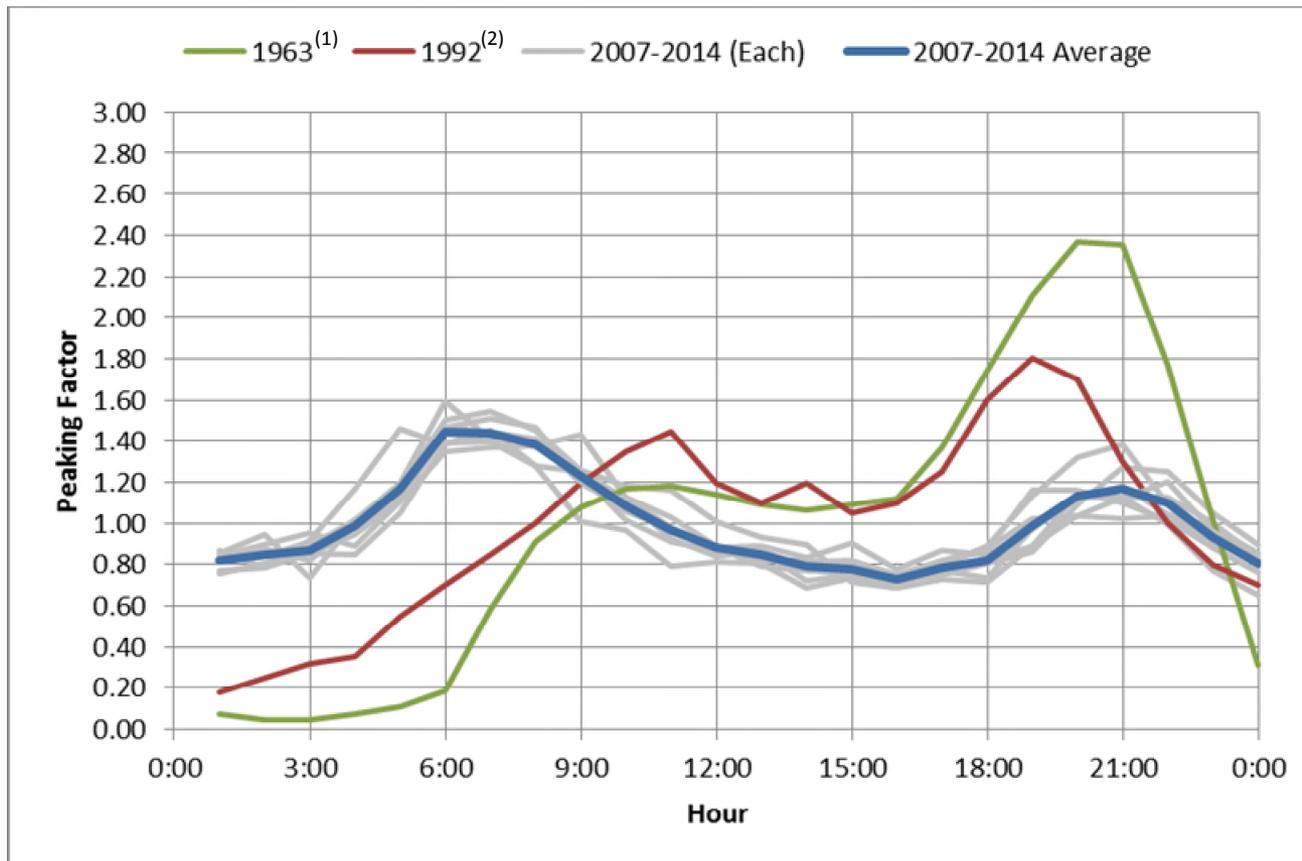


# Emergency/Standby Storage

- 1990: One ERU  $\approx$  270 gal/day
- 2013: One ERU = 187 gal/day
- At projected 2040 population/employment ( $\approx$ 100,000 ERUs):

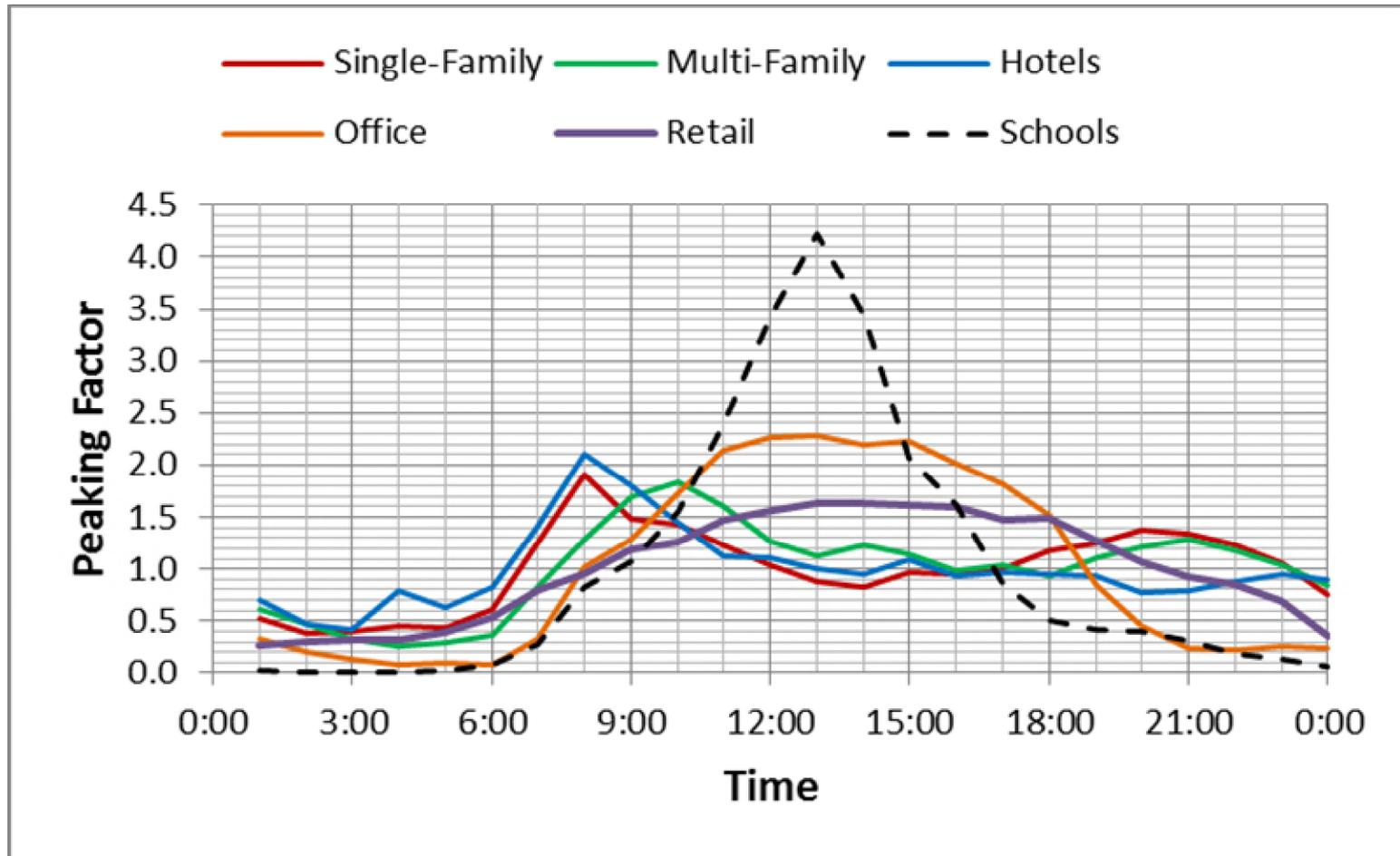
	One Day	Two Days
1990 Demands (ERU = 270 gal/day)	27.0 MG	54.0 MG
2013 Demands (ERU = 187 gal/day)	18.7 MG	37.4 MG
Difference	8.3 MG	16.6 MG

# System-Wide Diurnal Patterns

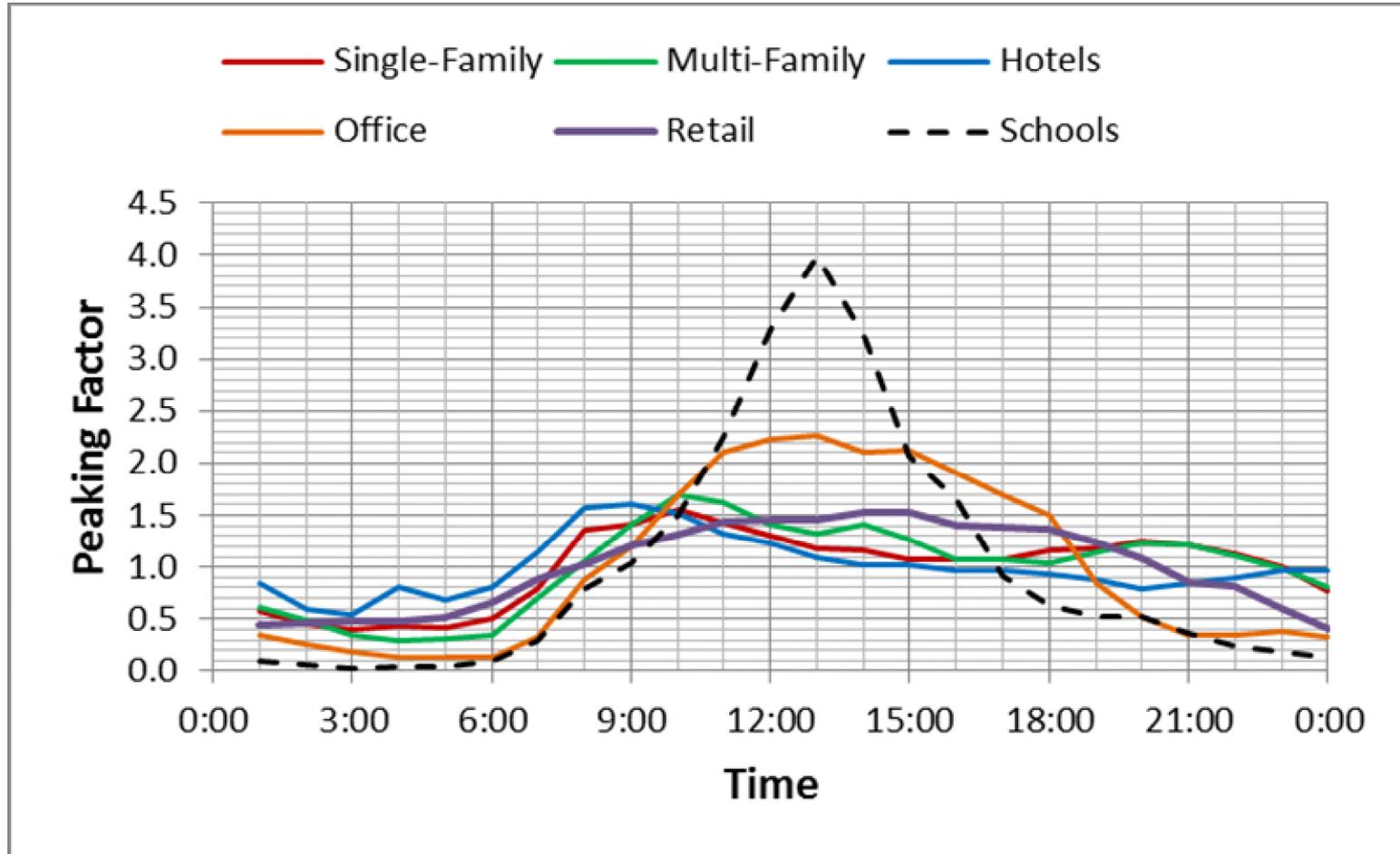


1. 1963 Plan and Program for Water System Development, King County Water District #97 (Lake Hills Water District)
2. 1992 City of Bellevue Water Comprehensive Plan

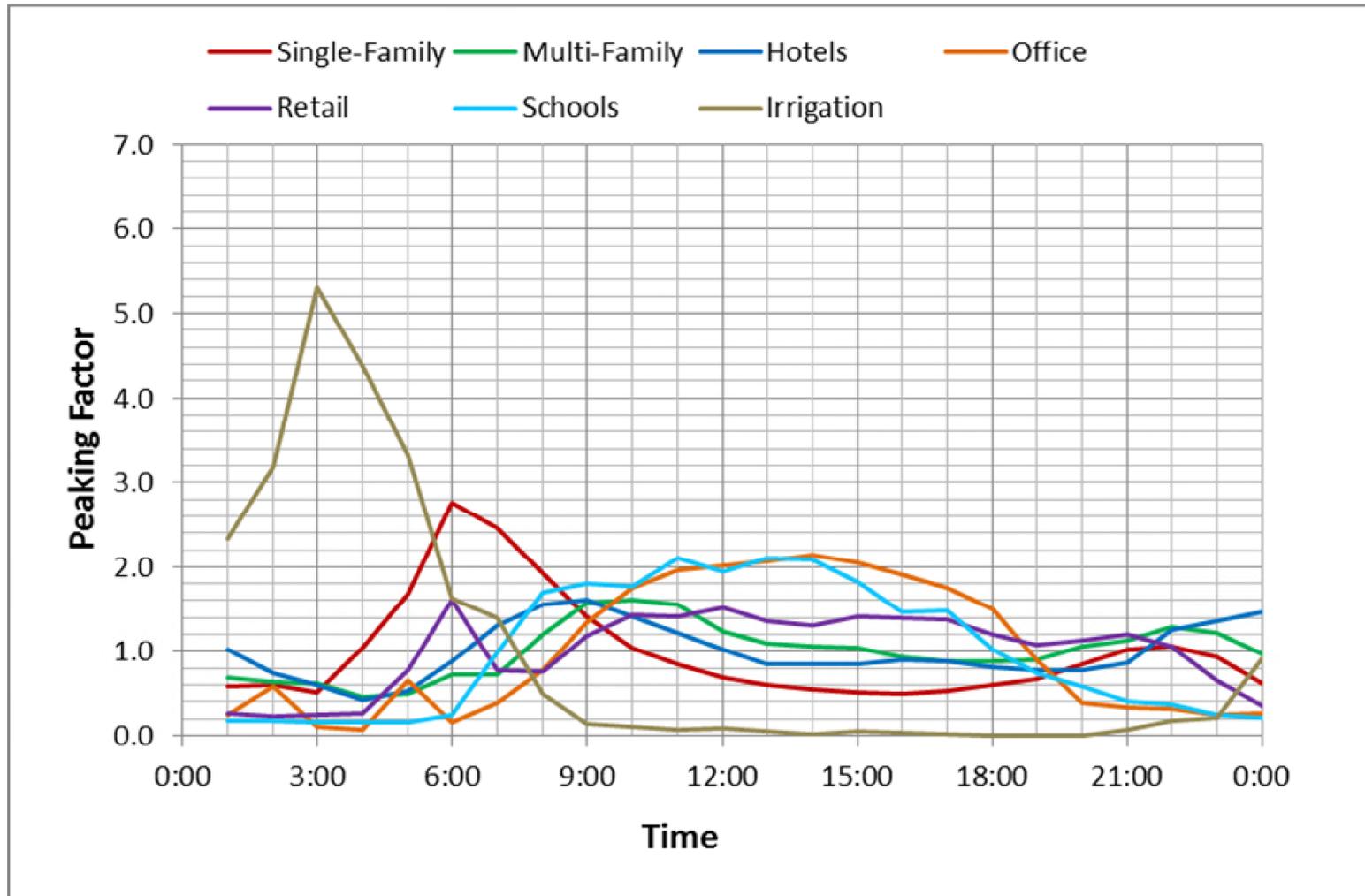
# 2013-2014 Winter Weekday



# 2013-2014 Winter Average Day

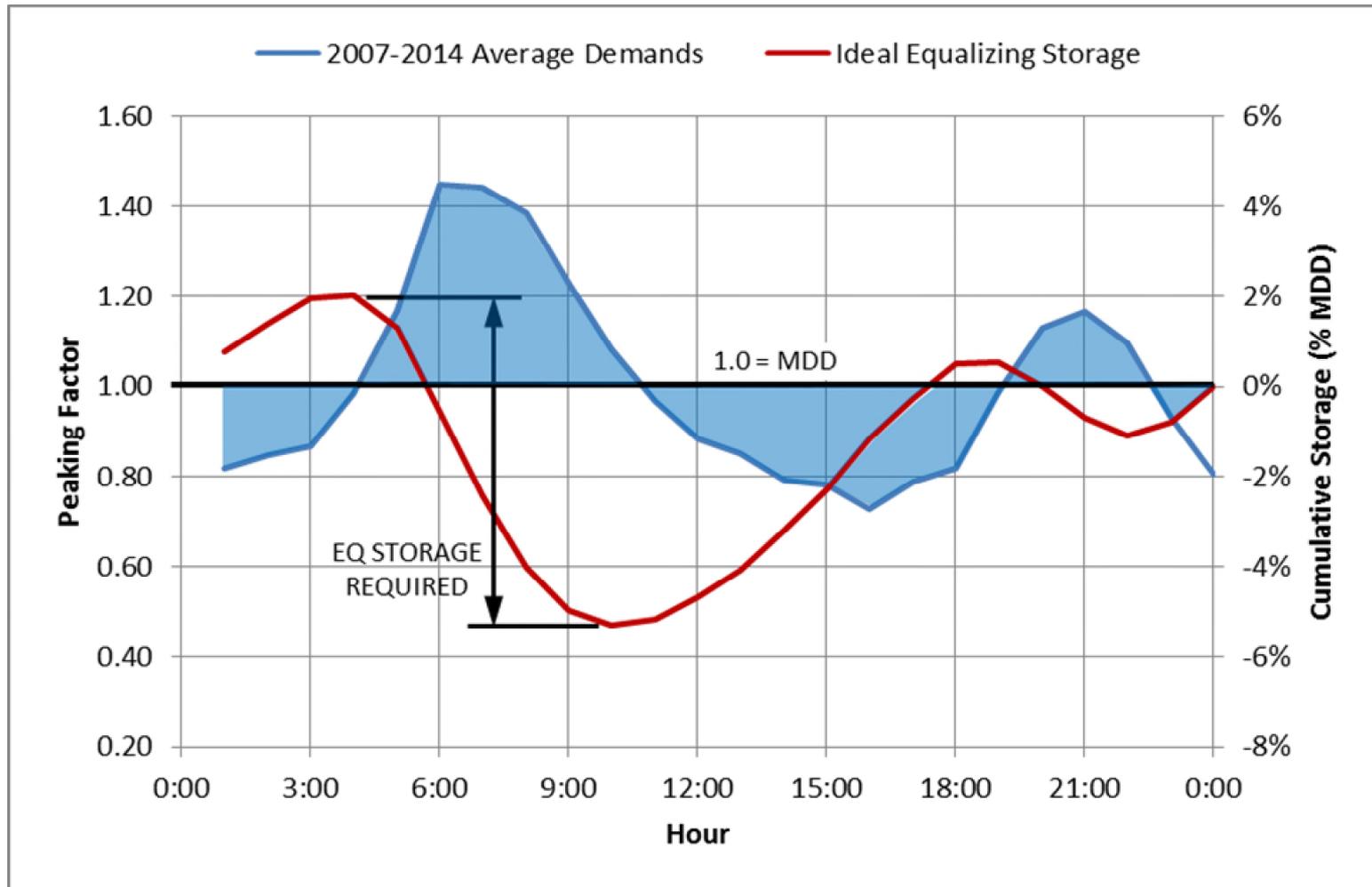


# 2014 Summer Average Day





# Equalizing Storage





# Equalizing Storage

- Previous assumption 20% of MDD
- 2014 analysis:
  - Single-Family areas 23% of MDD (assume 25%)
  - City-wide average 8% of MDD (assume 10%)
- Recent High-Year (2009) MDD: 37-MG
  - 20% = 7.4 MG
  - 10% = 3.7 MG
  - 3.5 MG less EQ storage required than old estimate



# Other Ramifications

- Supply & Treatment
- Pumping Capacity
- Reduced CIP needs (focus on R&R instead!)

# Questions?



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**al·ba·tross:** *noun*

1: any of a family (Diomedidae) of large web-footed seabirds that have long slender wings, are excellent gliders, and include the largest seabirds

2: (a) something that causes persistent deep concern or anxiety. (b) something that greatly hinders accomplishment; encumbrance