



Seattle
Public
Utilities

Seattle Public Utilities

Long-Term Water Demand Forecast

Operating Board
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Why Do We Need a Demand Forecast?

– **2013 Water System Plan**

- ✓ **Supply Planning**

- ✓ **Conservation Planning**

- ✓ **Transmission and Distribution System Planning**

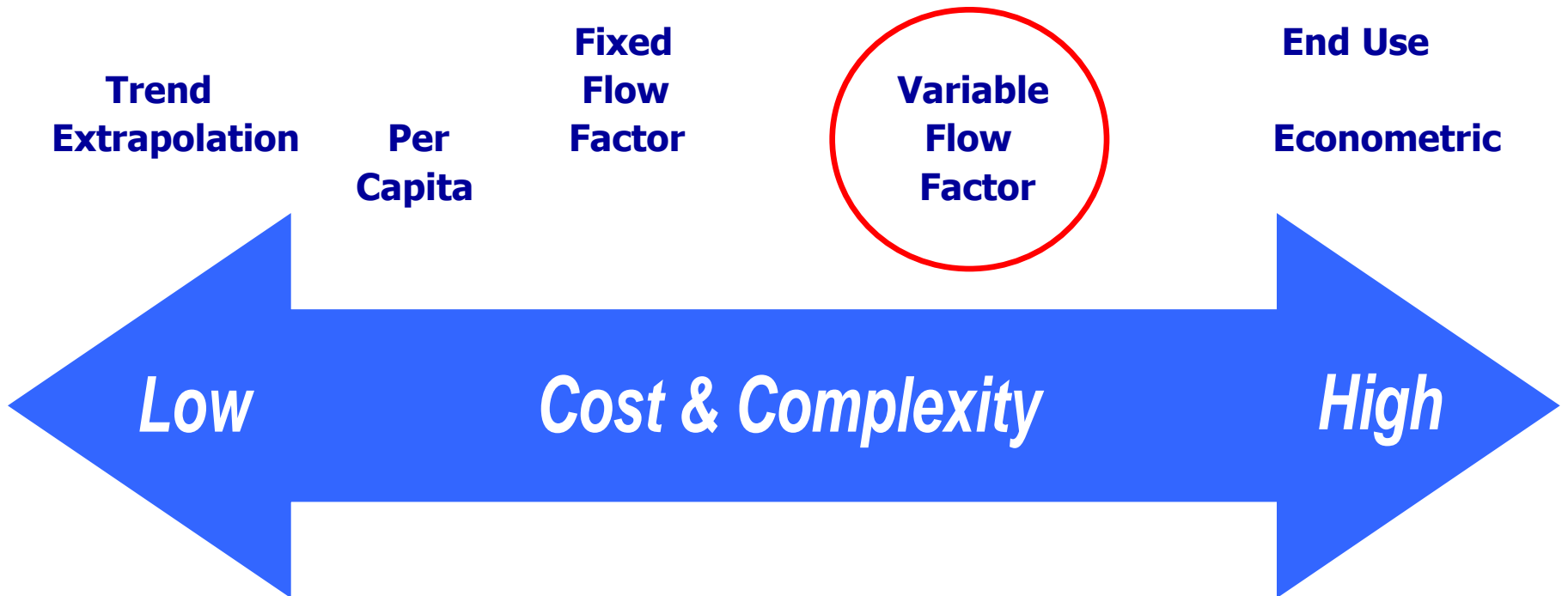
– **Financial Planning:**

- ✓ Long term

- ✓ Short Term (Rate Design)

Model Overview

Forecast Methods



Model Overview

- Base Year Flow Factors by Sector and for Seattle and Wholesale Customers:
 - ✓ Current weather-adjusted consumption
 - ✓ Current households and employment

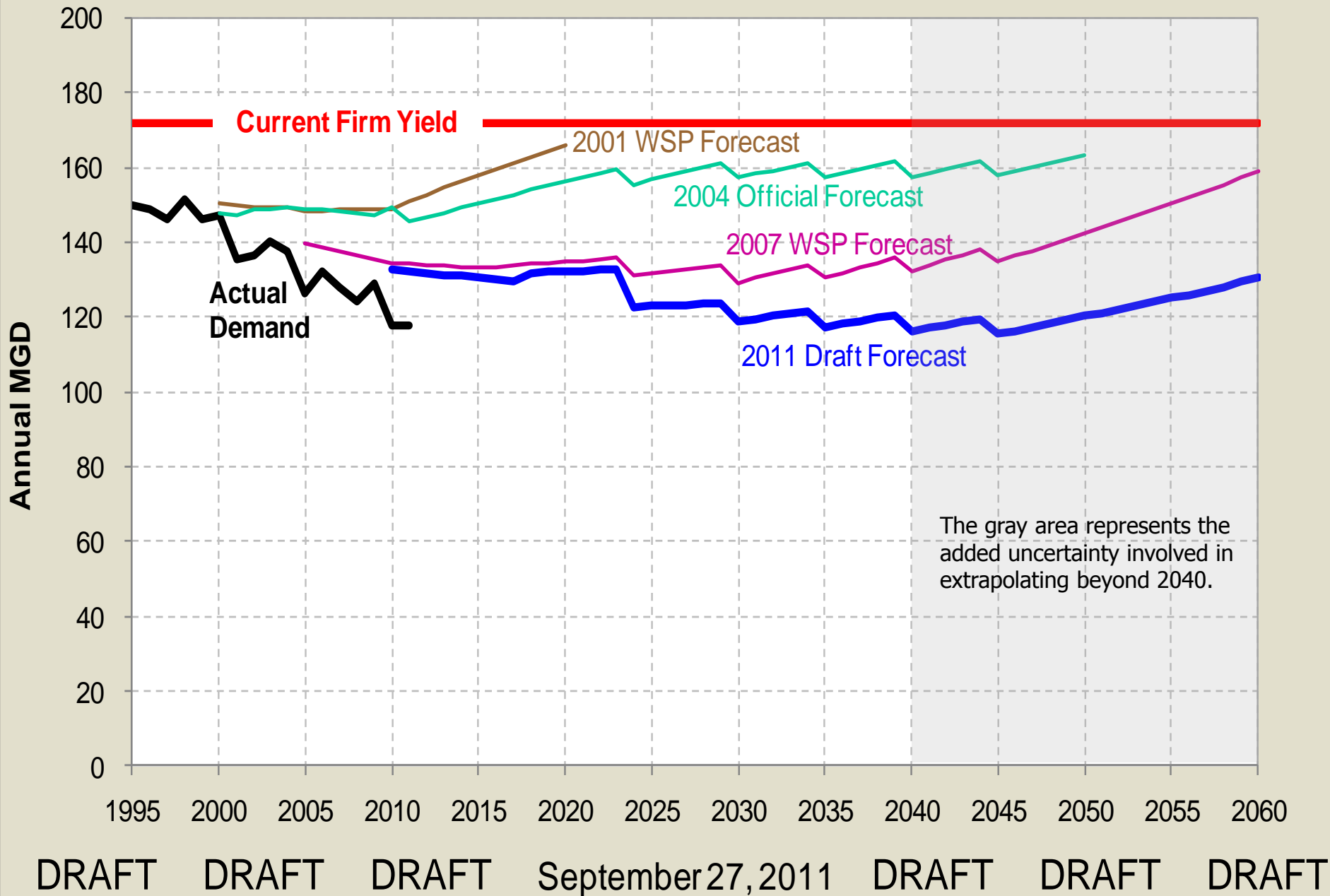
Model Overview

- Future Flow Factors are affected by:
 - ✓ Changes in average household size
 - ✓ Future income growth
 - ✓ Future growth in water/sewer rates
 - ✓ Future conservation program savings
 - ✓ Passive savings

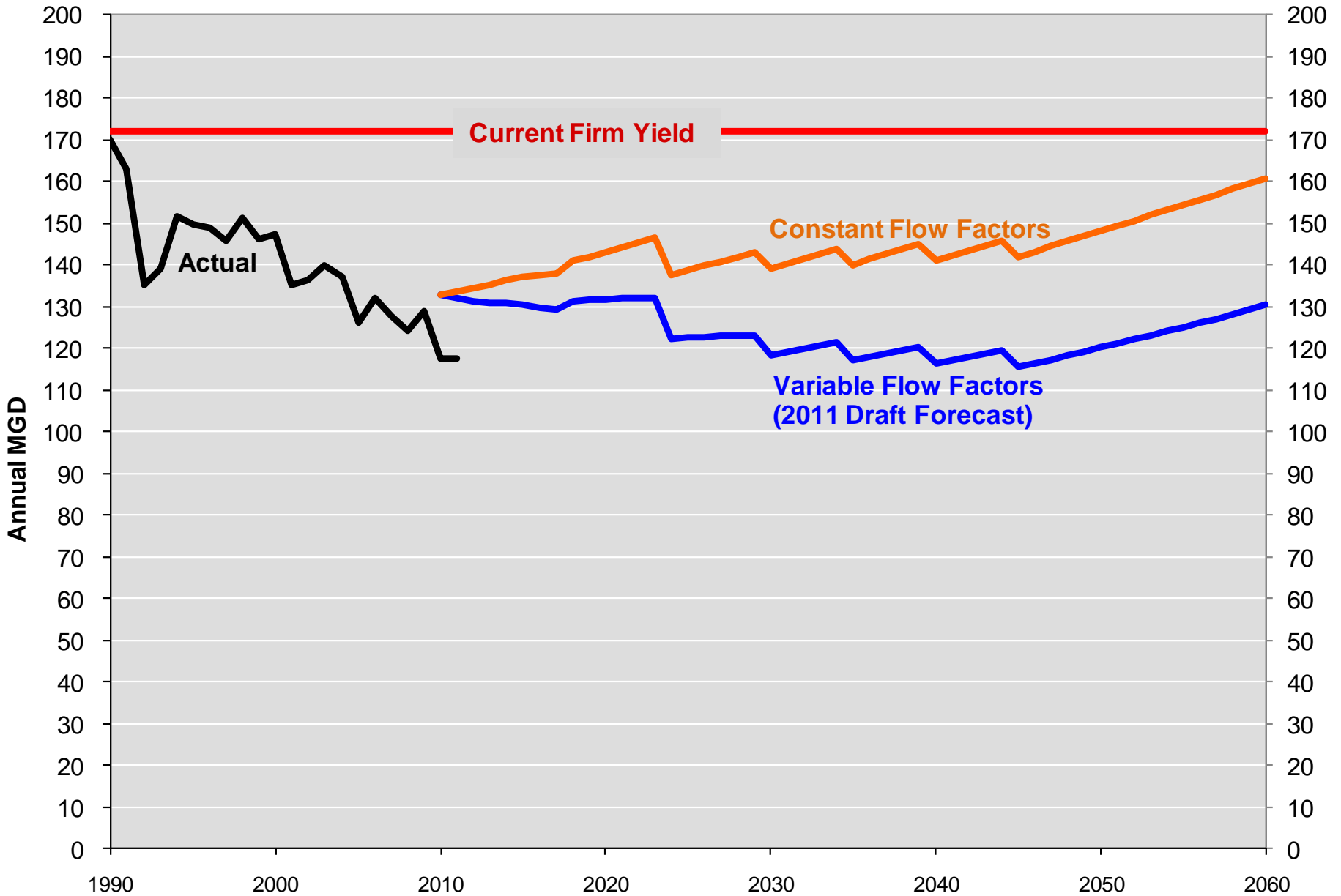
Model Overview (cont.)

- Forecasts of households and employment
 - ✓ Source: PSRC
 - ✓ Forecasts extrapolated beyond 2040
- Other Adjustments to Forecast:
 - ✓ Forecast of non-revenue water
 - ✓ Forecast of other sources of supply
 - ✓ Potential new wholesale customers
 - ✓ Block contracts

2011 Draft Forecast Compared to Earlier Forecasts



SPU Forecast with Constant and Variable Flow Factors

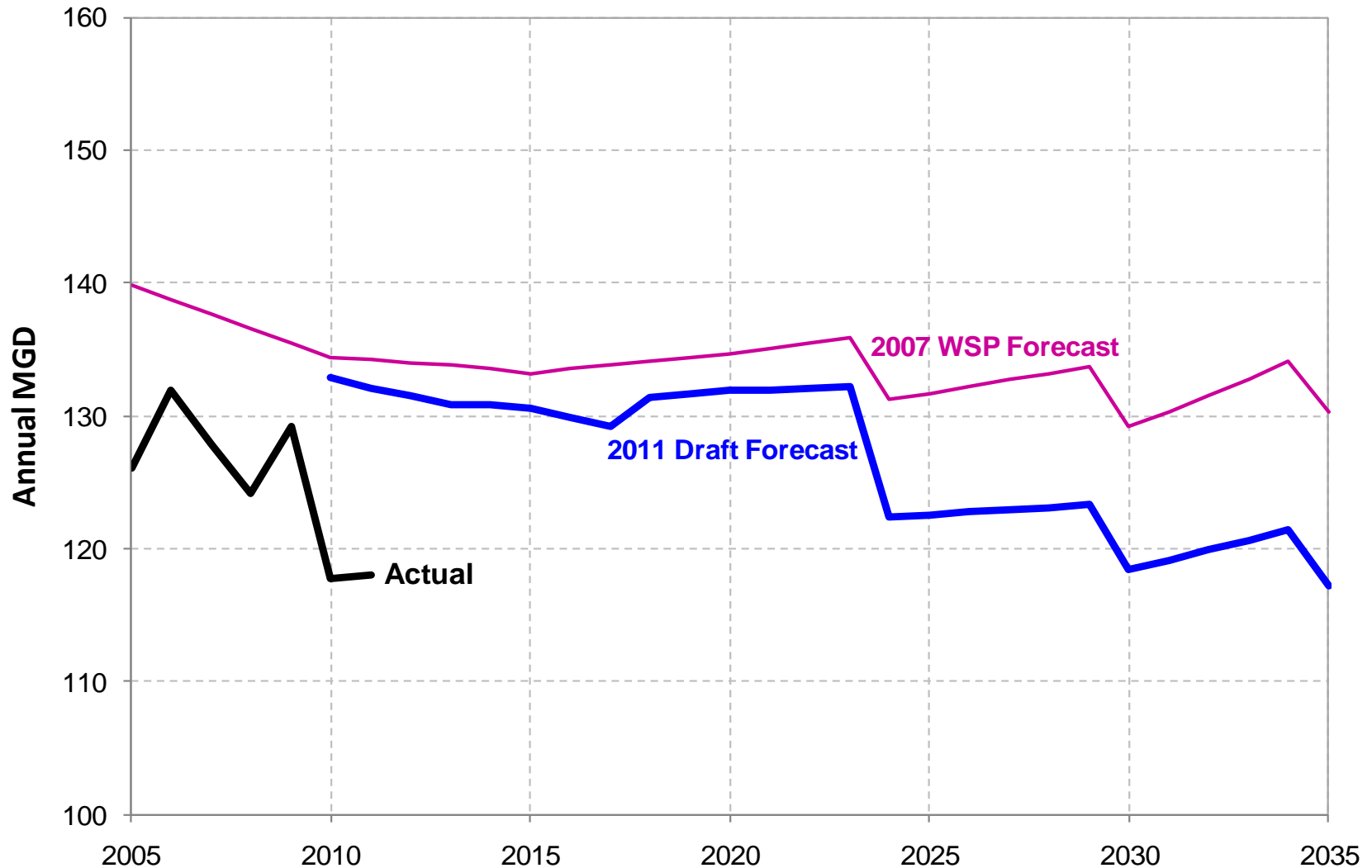


What's Changed?

1. **Calibrated to 2010** ↓
2. **Cascade Water Alliance Block** ↑ ↔
3. **PSRC Demographic Forecast** ↓
4. **Impact of Declining Household size** ↓
5. **Code Savings -> Passive Savings** ↓
6. **Median Rather Than Average Income** ↓
7. **Price & Conservation Assumptions** ↔ ↑
8. **Projected Non-Revenue Water** ↓
9. **Specific Wholesale Customers** ↔

2. Cascade Block

Supplemental Block from 2008 Contract



4. Adjust for Declining Household Size

- Calculate projected annual household size
- Reduce per household flow factors (by % change in household size times size elasticity)
- Elasticity of demand with respect to household size = 0.38
- Source: End-Use study conducted by SWD in mid-1990s.
- **10% decline in hhld size by 2060**
- **Reduces forecast by 7 mgd (5%)**

5. Code Savings -> Passive Savings

Passive Savings consists of:

– Code savings

✓ 1992 code for showerheads, toilets and aerators

✓ 2001 code for clothes washers

✓ 2002 code for aerators

✓ Anticipated 2011 (effective 2015)

– Beyond Code – Market Transformation

✓ Energy Star/CEE standards for washing machines

✓ Replacements

✓ New construction

✓ PSE

5. Code Savings -> Passive Savings

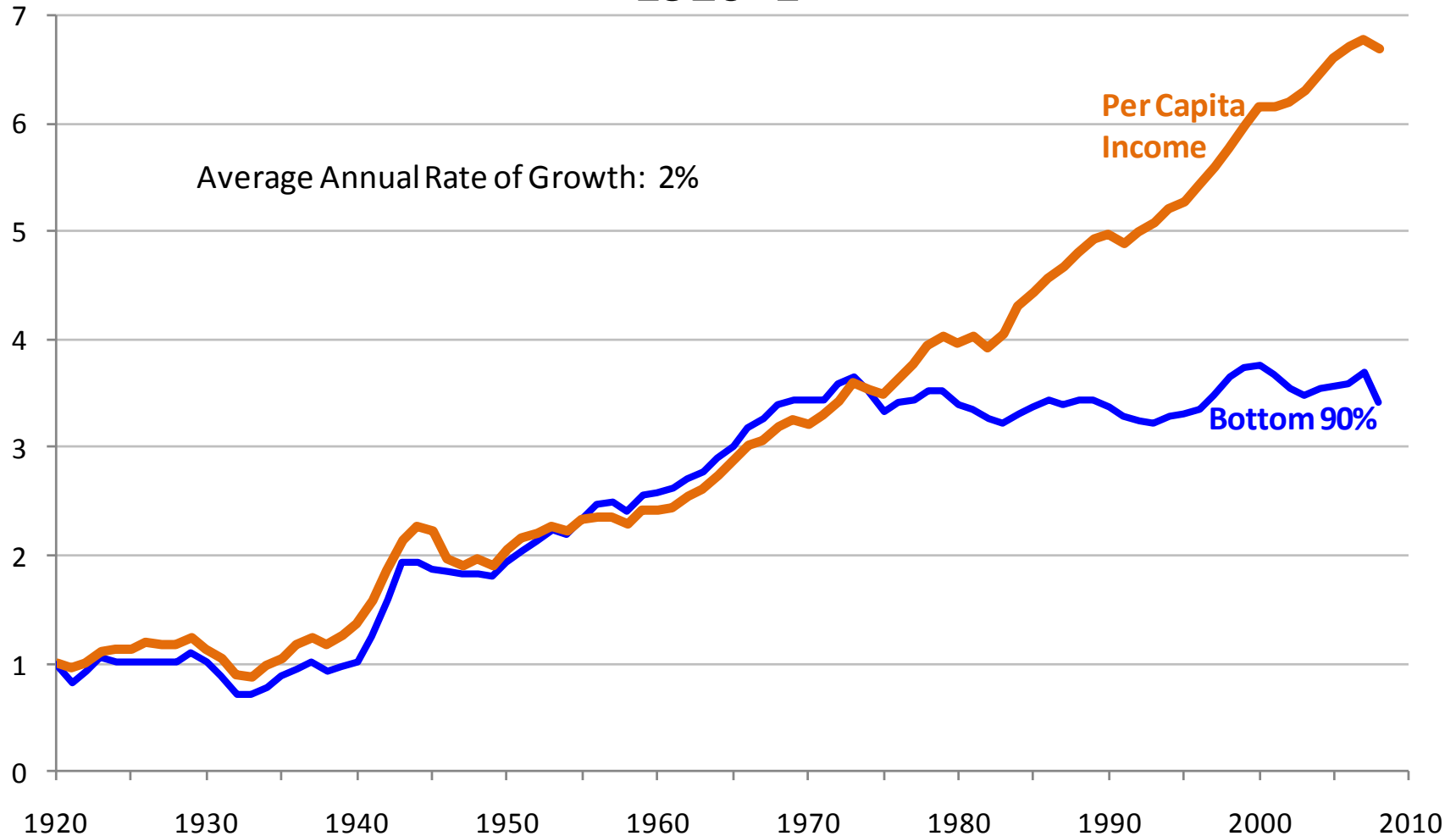
Passive Savings in MGD

	Single Family	Multi- family	Non- Residential	Total
2020	2.5	1.7	0.6	4.9
2030	5.6	4.0	1.2	10.8
2040	7.5	5.8	1.7	15.0
2050	8.5	7.0	2.1	17.7
2060	9.0	7.8	2.4	19.2

- Passive Savings reduces 2060 forecast by 19 mgd and exceeds earlier estimate of code savings by 7 mgd.

6. Income Growth – Median vs Average

Index of U.S. Per Capita and Bottom 90% Income:
1920=1



6. Income Growth – Median vs Average

- Median Income
 - ✓ Assume average annual growth 0.9%
- Reduces forecast of 2060 demand by 12 mgd (8%)

7. Water & Sewer Rates

- Water and sewer rates have increased by more than 2% annually, inflation-adjusted.
- Rate models project almost flat real rates after several years of large increases.

Annual Growth Rates

	Retail	Wholesale
2010-2015	5.1%	2.0%
2016-2060	0.4%	0.4%

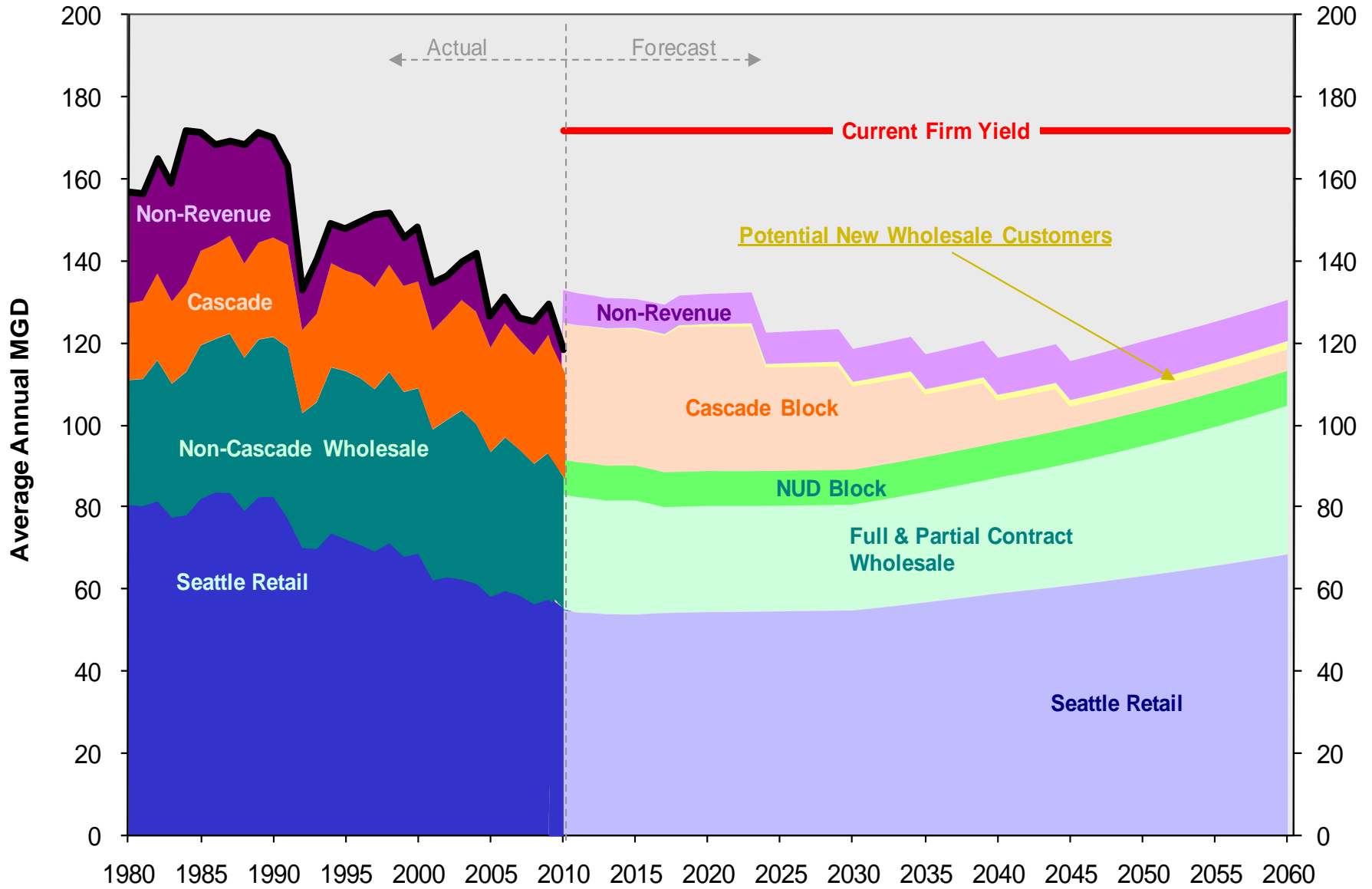
7. Rates & Programmatic Conservation

- 15 mgd of combined rate-induced & programmatic conservation by 2030
 - ✓ Rate-induced savings by 2030: 7 mgd
 - ✓ Implies 8 mgd of programmatic conservation
- Model predicts 5 mgd of additional rate-induced savings from 2030-2060
 - ✓ No additional programmatic savings
- Increases forecast of 2060 demand by 3 mgd

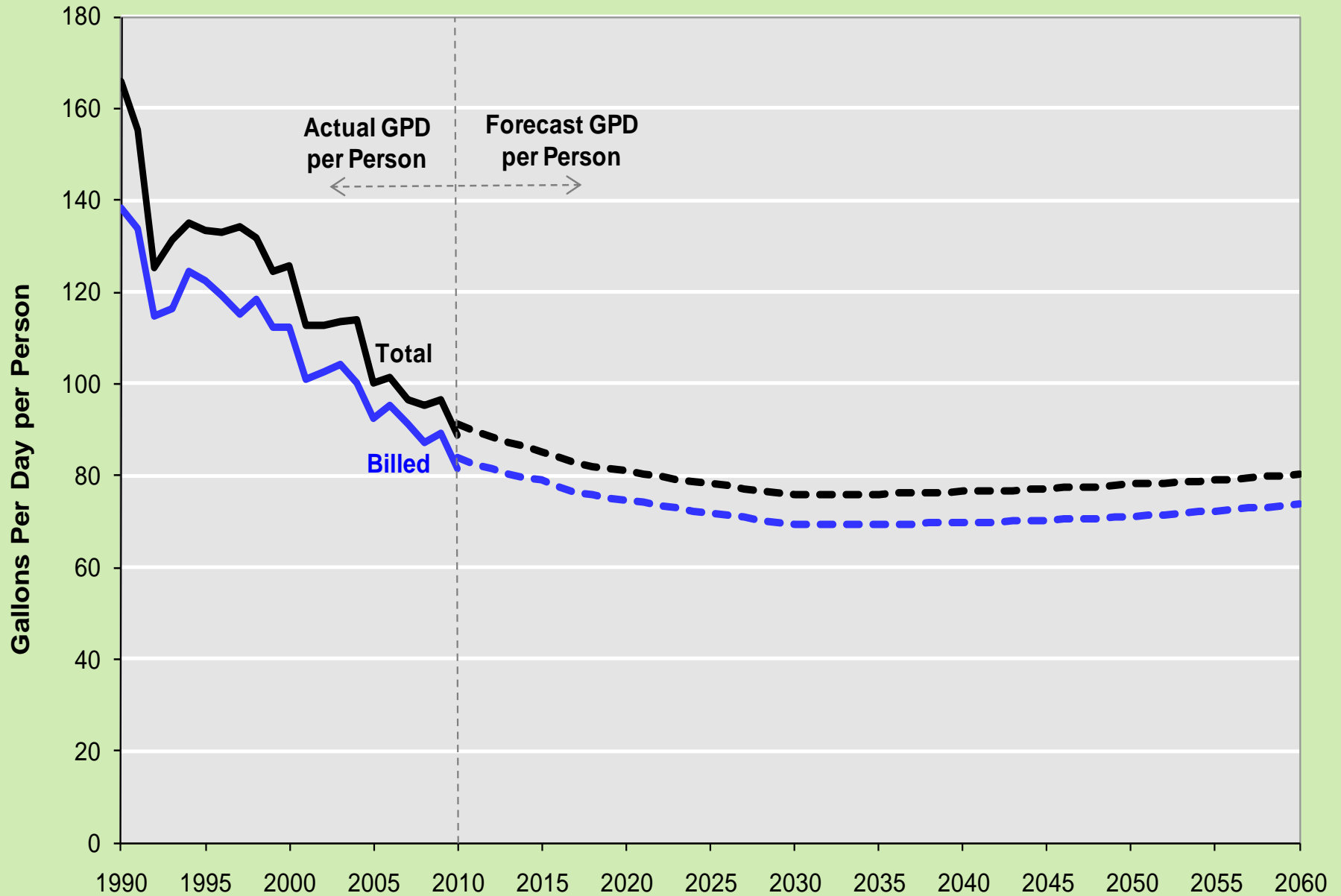
8 & 9. Other Stuff

- Non-Revenue Water
- Renton
- Other New Wholesale Customers

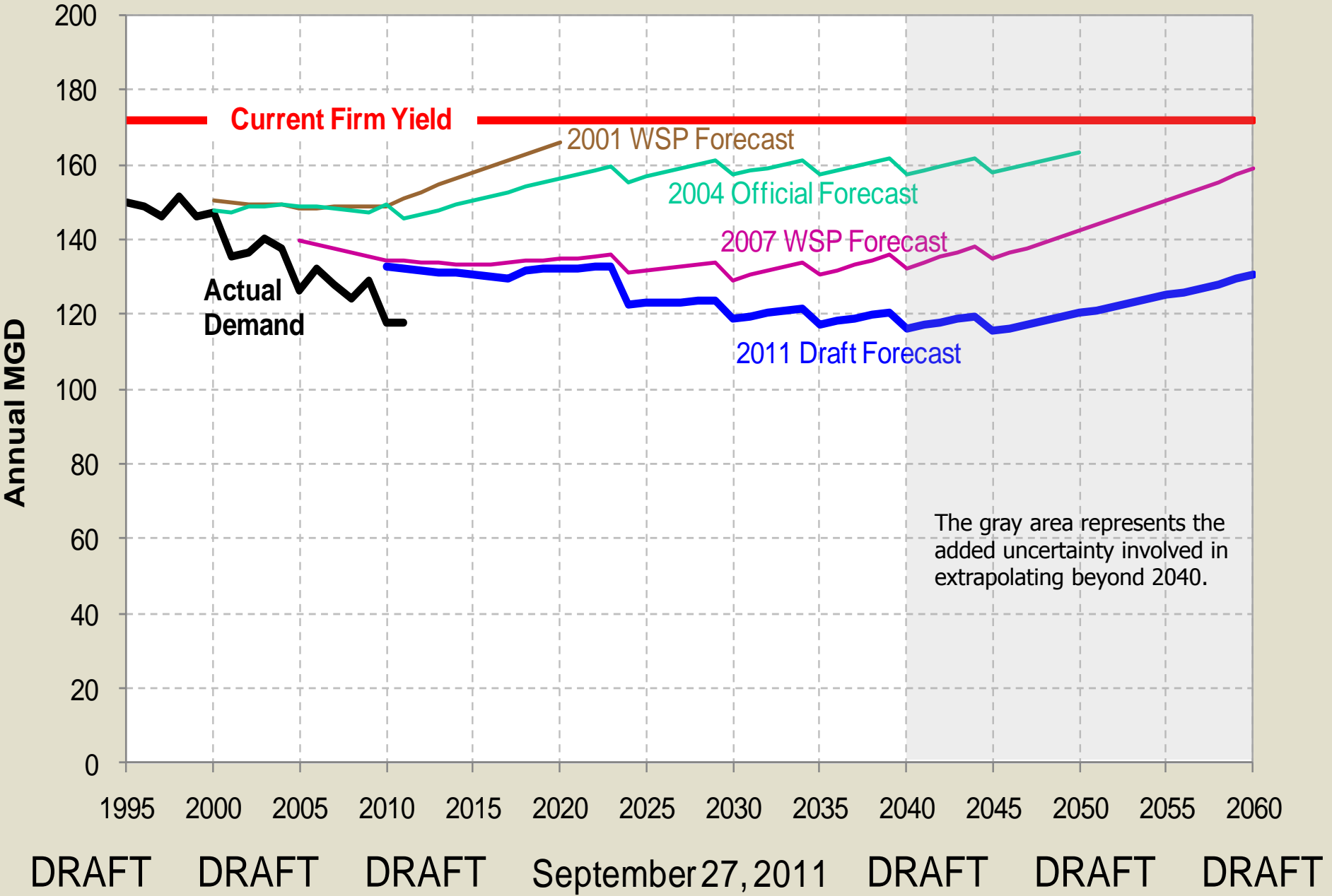
Components of Actual and Forecast Demand: 1980-2010-2060



Actual & Forecast Total & Billed Water Consumption Per Capita: Saving Water Partnership Customers



2011 Draft Forecast Compared to Earlier Forecasts



The gray area represents the added uncertainty involved in extrapolating beyond 2040.

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