Comprehensive Water Supply Planning:
El Paso's Water Resources Planning Tool

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ECO El Paso Sustainability Conference
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El Paso Water Background

- Circa 1910
- Animal power and steam
- Used by City Water Department

Agenda

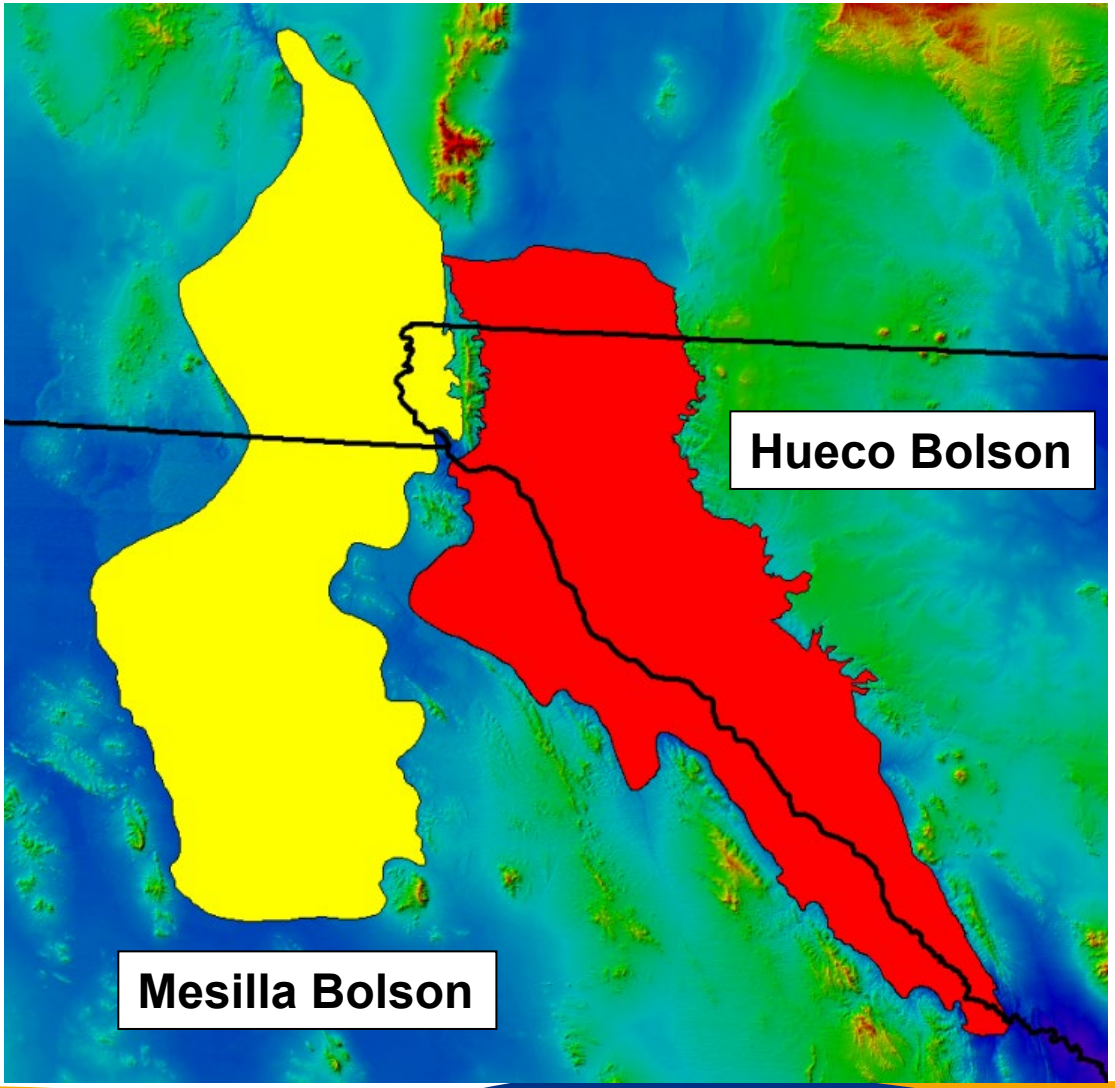
- **El Paso Water Background**
- **WRPT Model**
  - Demand Inputs
  - Supply Inputs
  - Cost Inputs
  - Financial Inputs
  - Outputs
- **WRPT Scenario Planning Example Results**

El Paso Water Background

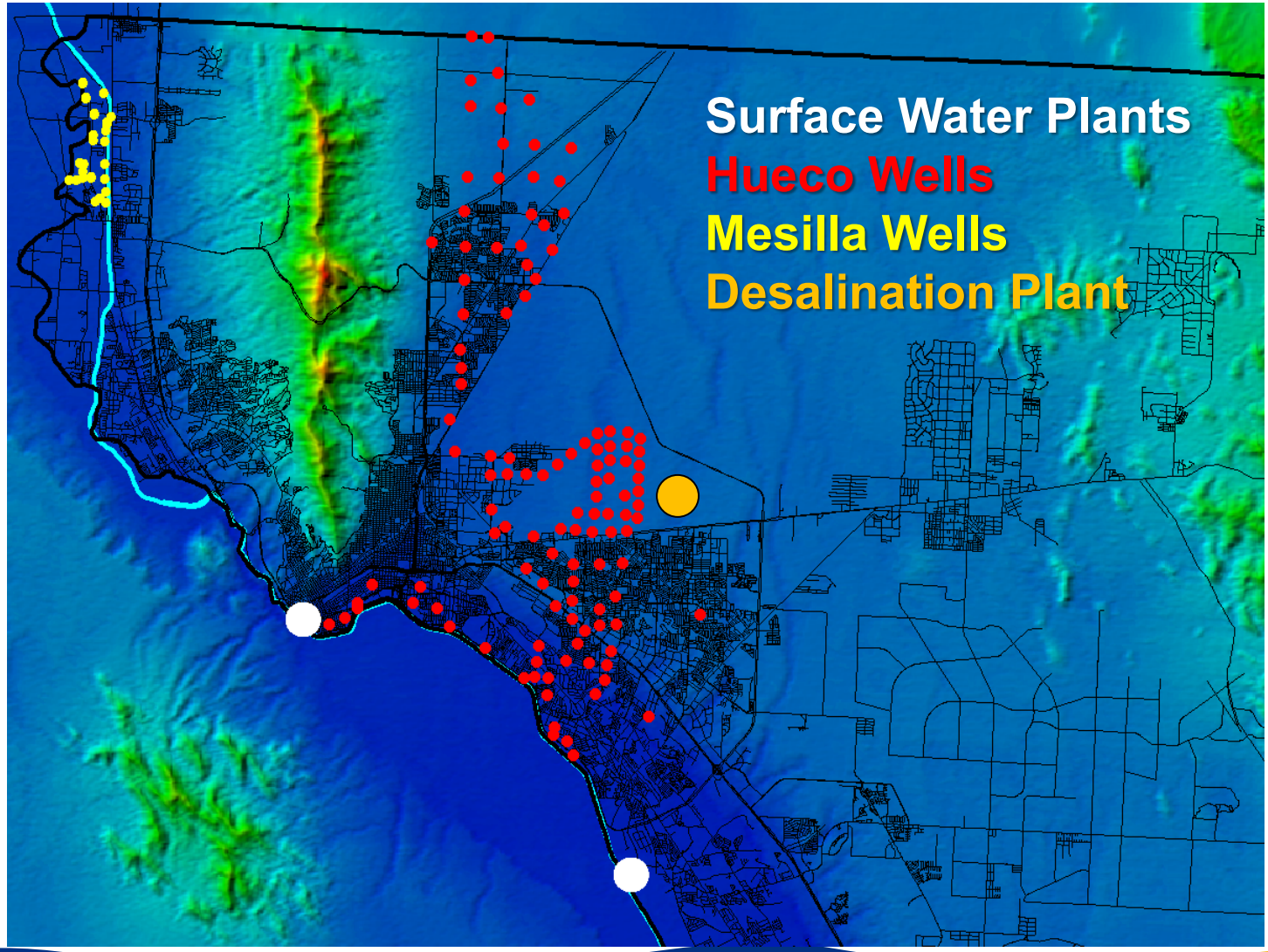
El Paso Water Background

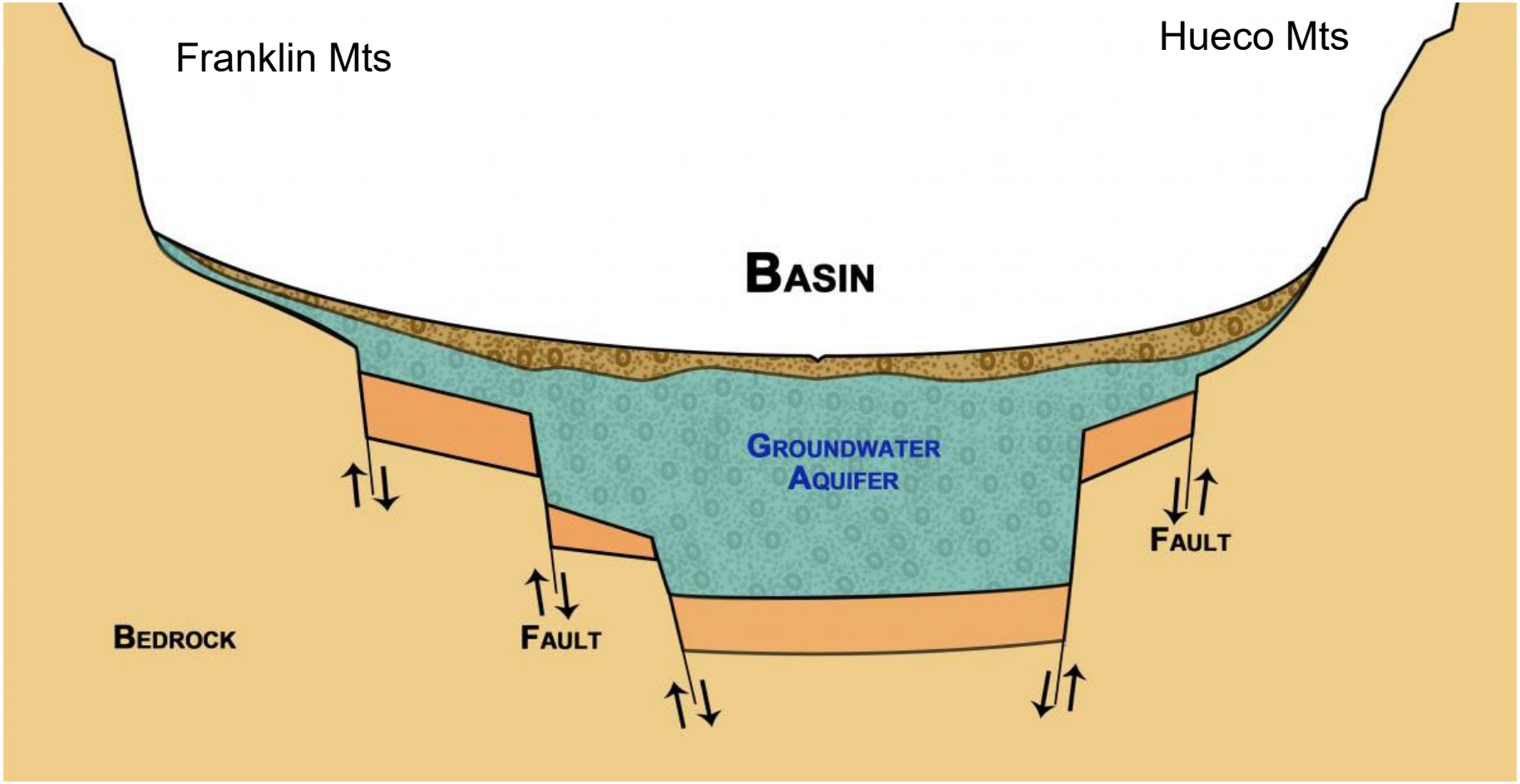
- Service Area
  - ~840,000
- Demand
  - ~114,000 AFY (37 BGY), 132 gpcd
- Supply
  - Groundwater
    - Hueco Bolson (80,000 AFY, 26 BGD)
    - Mesilla Bolson (20,000 AFY, 6.5 BGD)
  - Surface Water (Water Rights)
    - 70,000 AFY (23 BGY)
    - 100 MGD treatment capacity
  - Brackish (KBH)
    - 27.5 MGD (max historical ~15,000 AFY or 4.8 BGY)
  - Non-potable Reuse
    - 6,000 AFY, 2 BGY

El Paso Water Background



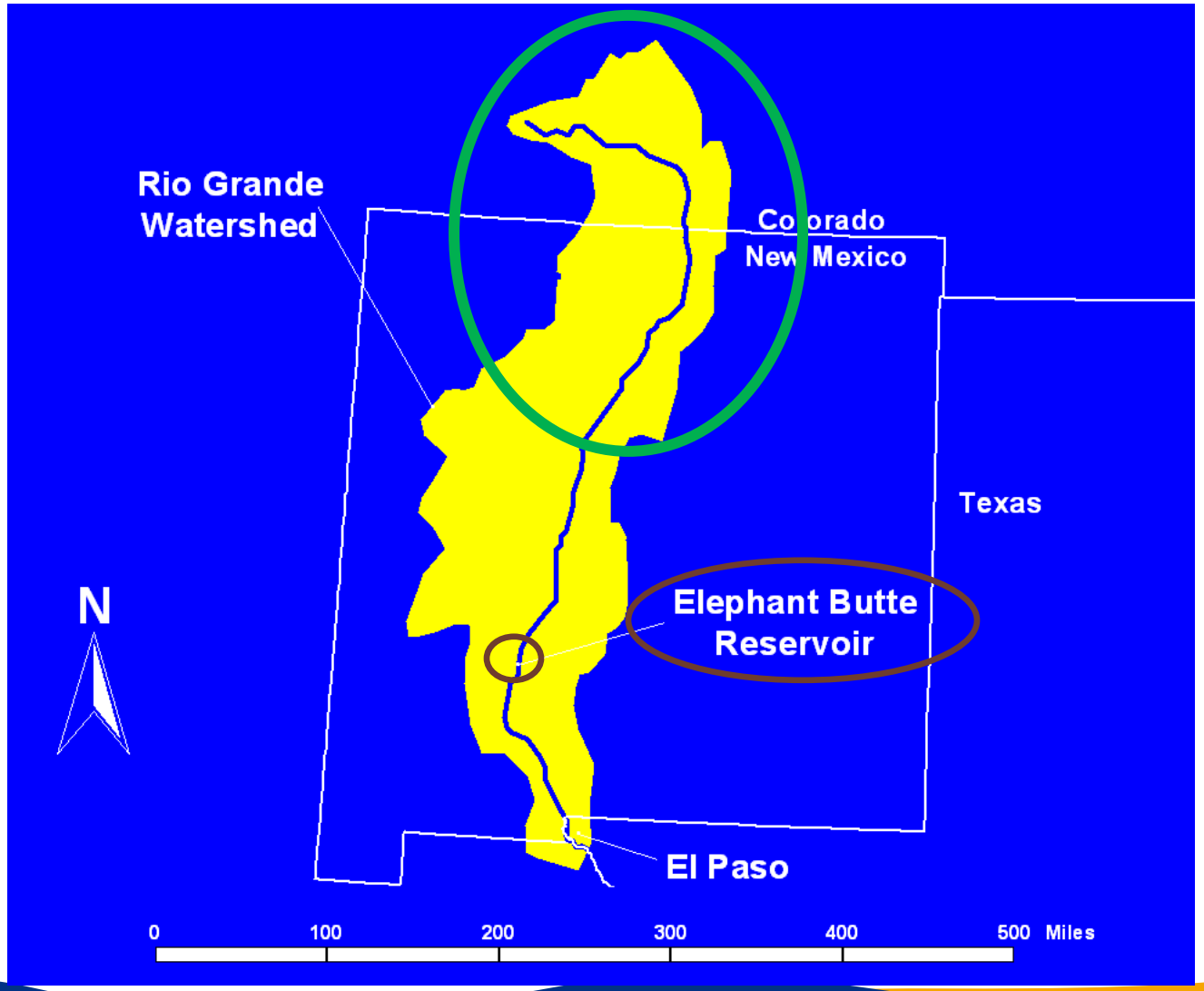
El Paso Water Background





Hueco Bolson Aquifer

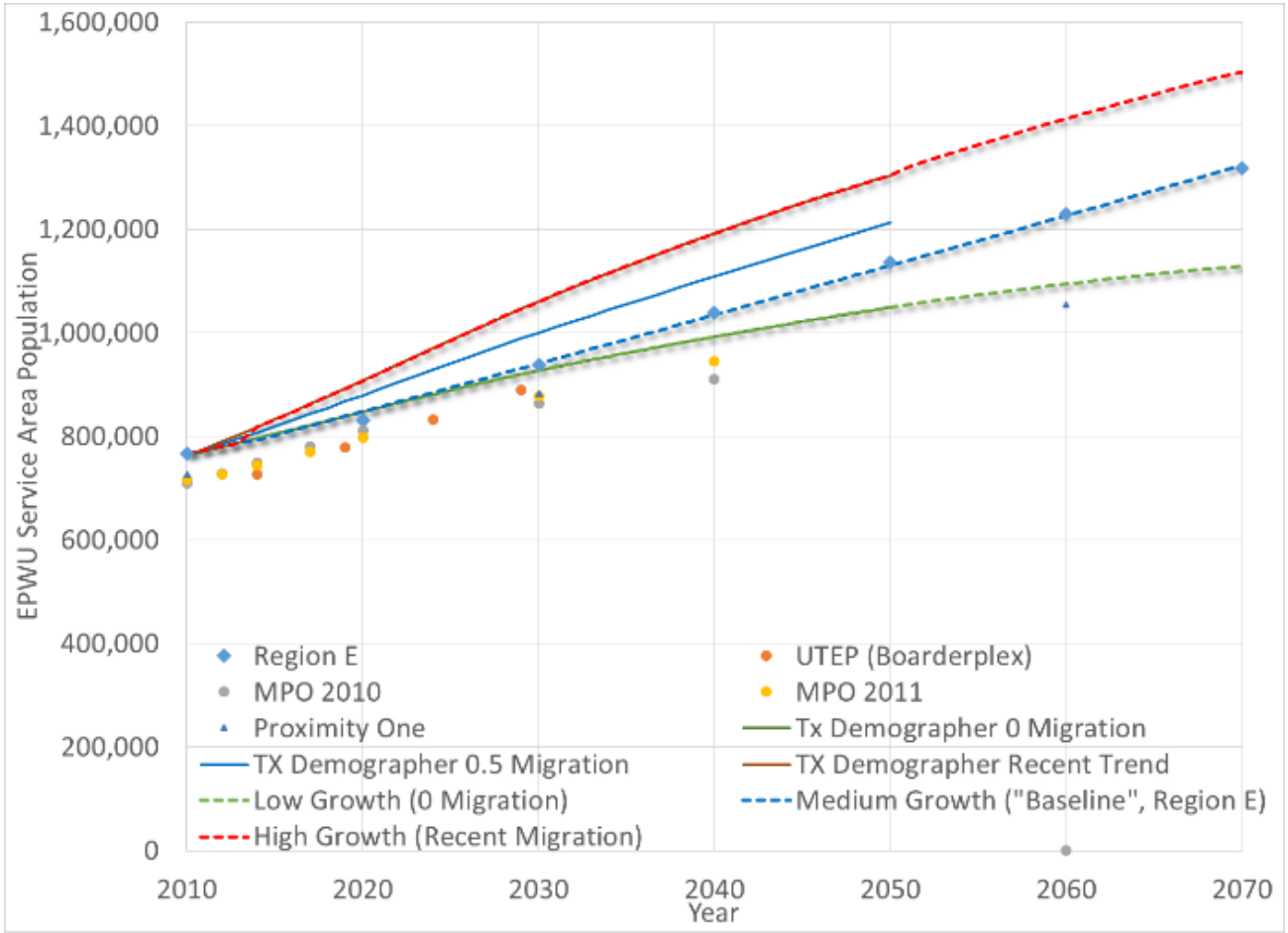
Water in the Rio Grande is stored at the Elephant Butte Reservoir



Water Resources Planning Tool

Population and Demand - Population

- Looked at multiple sources
- Selected a range of potential futures
  - Low (TxDem)
  - Region E
  - High (TxDem)



Population and Demand – Population by Geography

- Used planning area portions and total population to divide by planning area

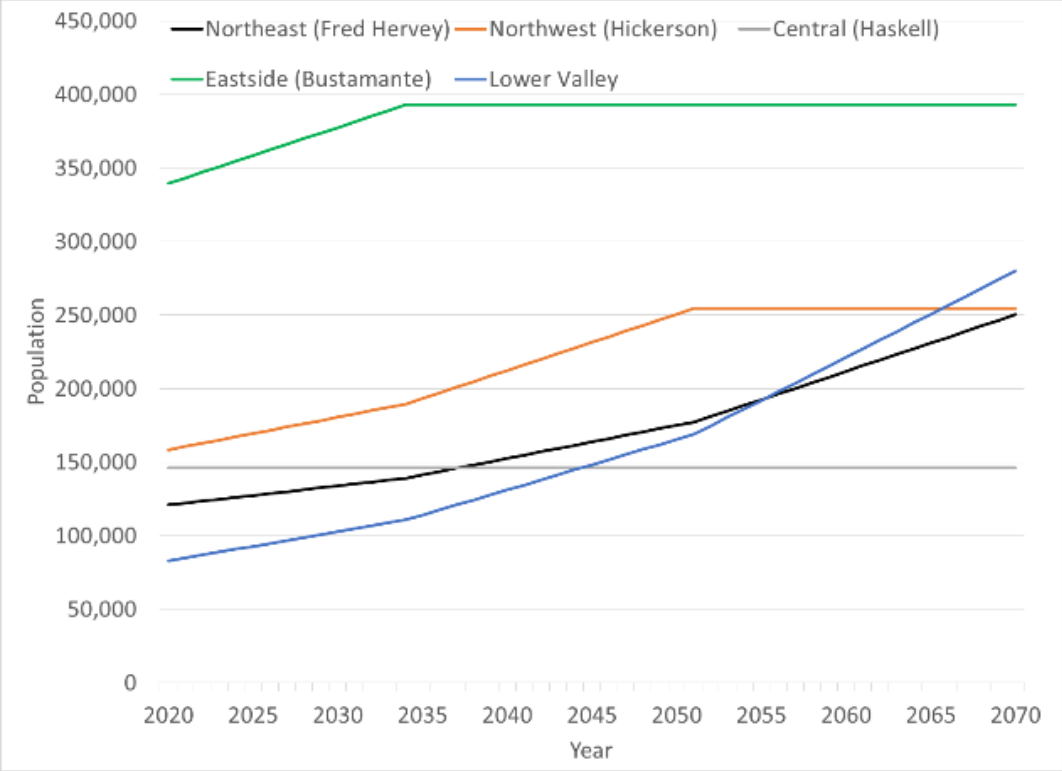


TABLE 2. Proportion of EPWU Service Population by Geographic Planning Area

	Northeast (Fred He	west (Hicke	ntral (Haske	ide (Bustam	Lower Valley
2010 Proportion	14%	18%	19%	40%	9%
Growth Proportion through 2030	14%	24%	0%	41%	21%

Population and Demand – Per Capita Usage

- Planning area population, customer billing data, and non-revenue gpcd can be used to estimate gpcd by planning area

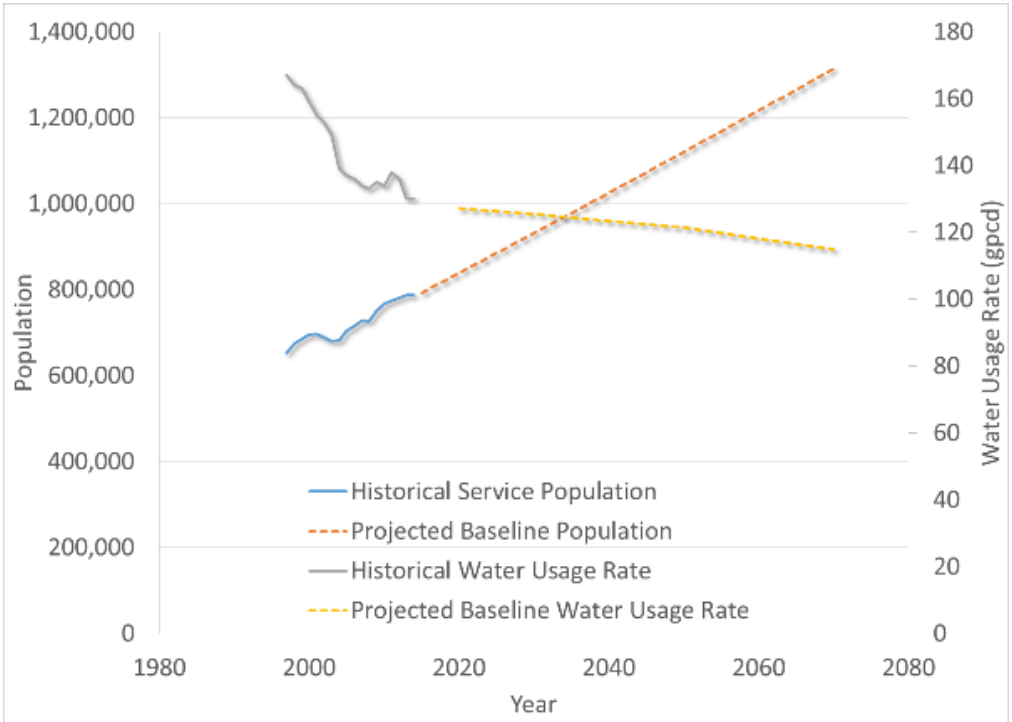


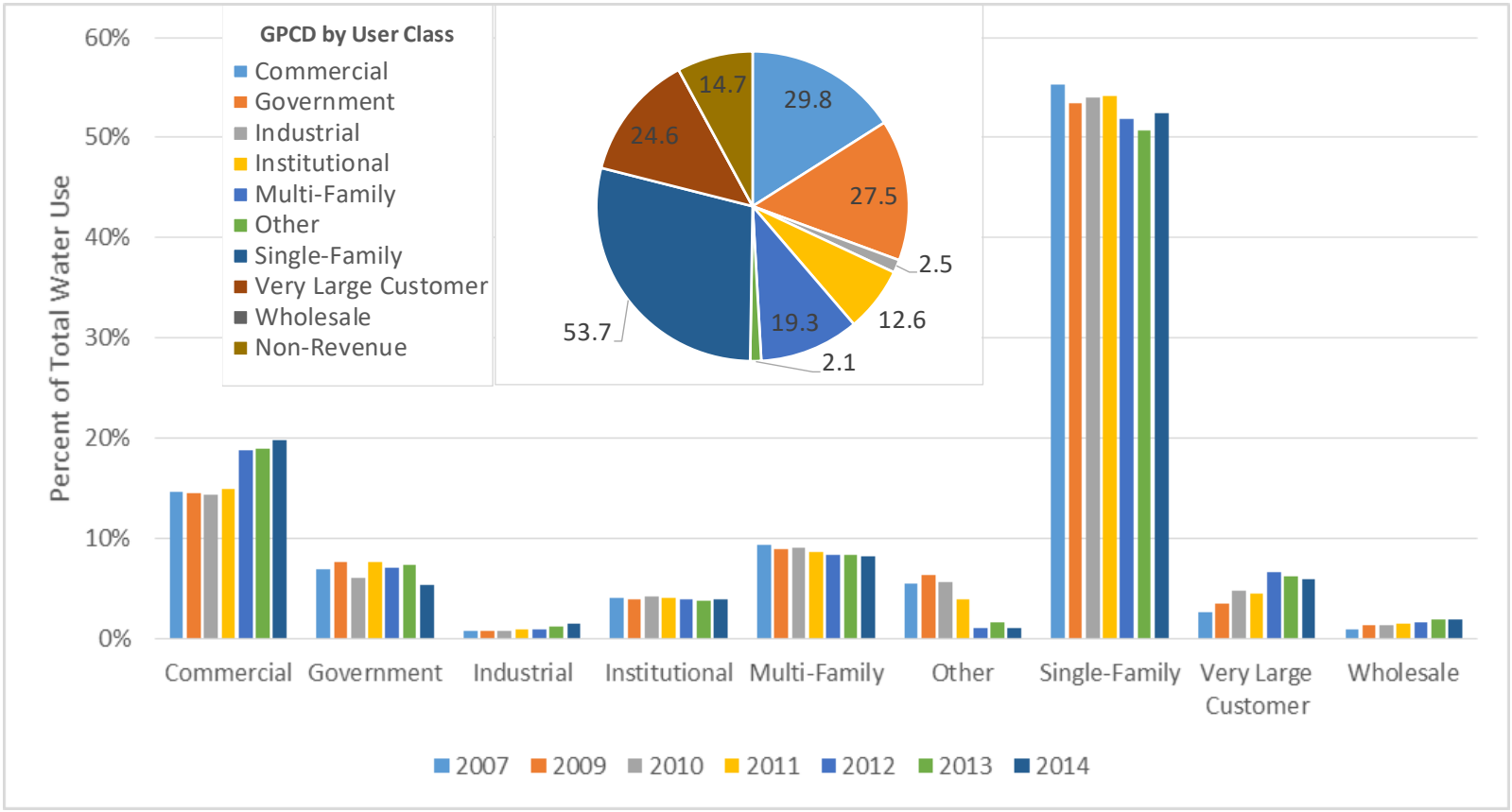
Table 3. Estimated Water Usage Rate by Geography (gpcd)

	Northeast (Fred Hervey)	Northwest (Hickerson)	Central (Haskell)	Eastside (Bustamante)	Lower Valley
2010	95	138	187	126	106
2011	96	141	202	130	91
2012	124	139	198	130	46
2013	115	133	203	127	16
2014	103	134	187	124	58

Population and Demand – Customer Class

Northeast (Fred Hervey)

Current GPCD: 103



Population and Demand – Wastewater

- Understanding wastewater return is important for future projection of available wastewater

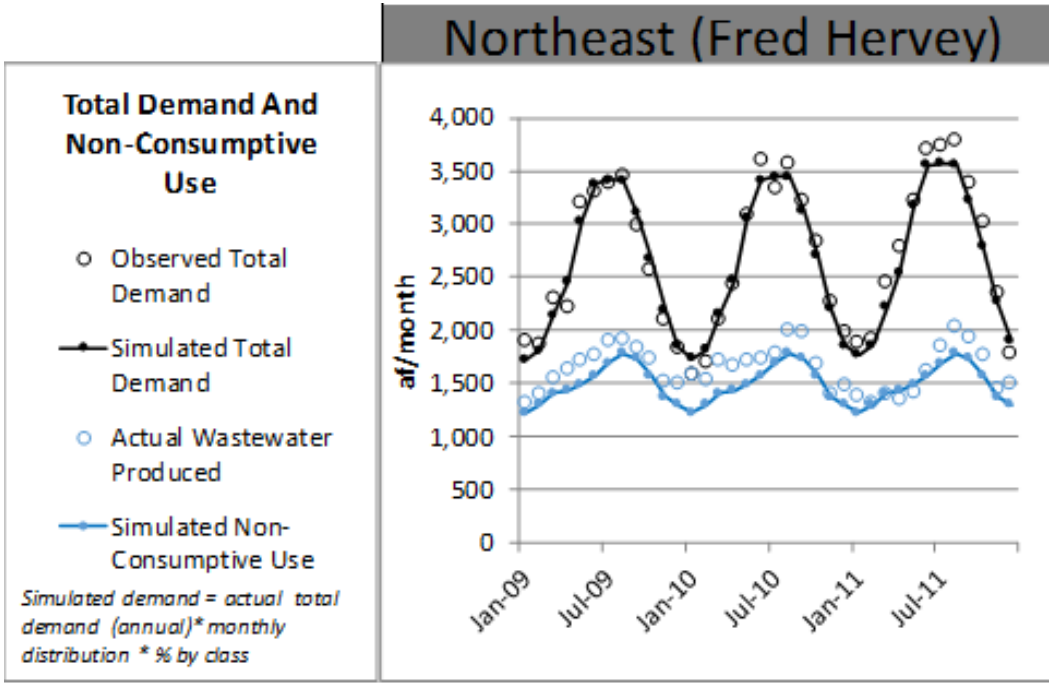
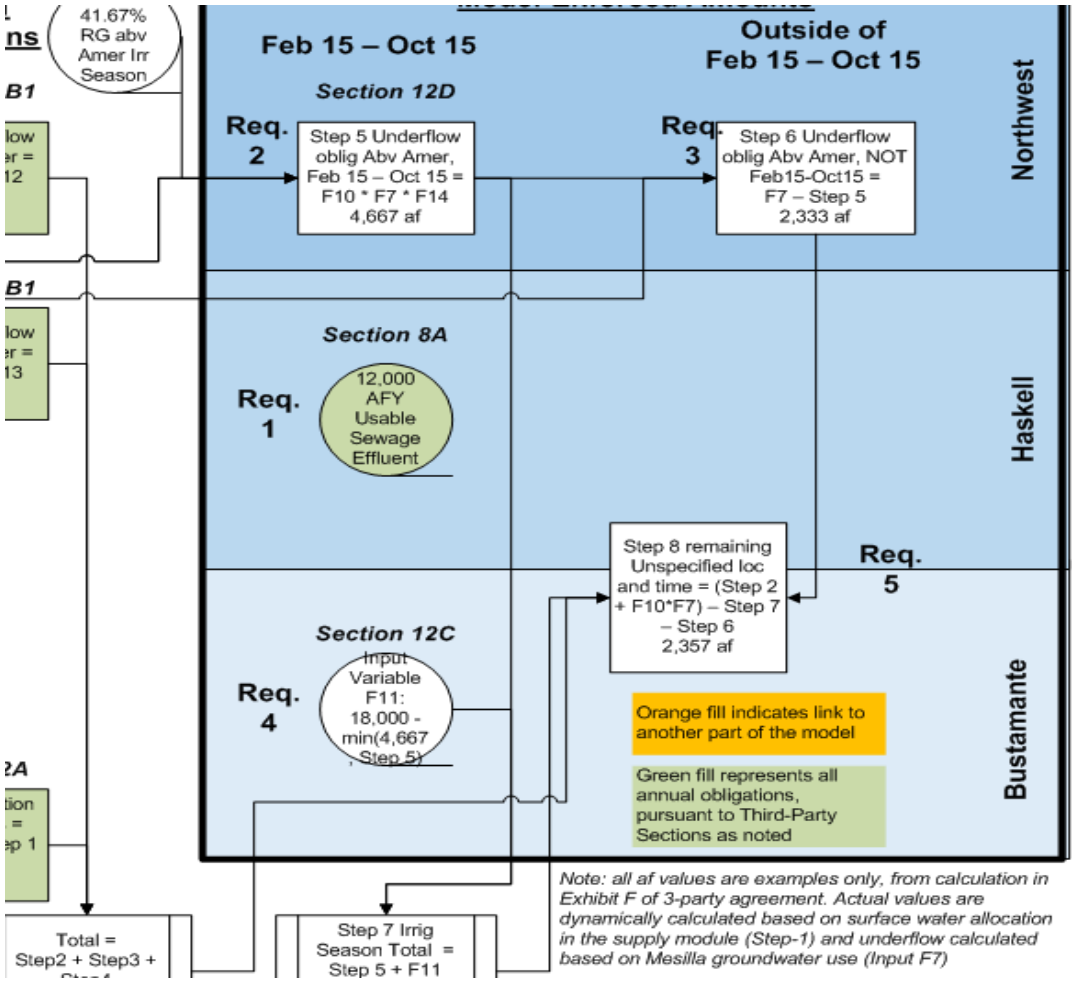


TABLE 4.			
Wastewater Return Flow, 1997 to 2014			
Year	Demand (acre-feet)	Wastewater Influent (acre-feet)	Wastewater Influent (Percent of Total Demand)
1997	121,919	69,310	57%
1998	123,821	70,475	57%
1999	124,957	71,460	57%
2000	124,159	68,377	55%
2001	121,029	67,932	56%
2002	118,022	70,161	59%
2003	113,541	67,227	59%
2004	106,361	65,311	61%
2005	107,926	62,556	58%
2006	108,816	65,222	60%
2007	109,368	64,942	59%
2008	108,386	65,400	60%
2009	113,756	65,703	58%
2010	114,677	67,596	59%
2011	119,157	68,918	58%
2012	119,126	69,365	58%
2013	114,922	66,196	58%
2014	114,536	65,715	57%

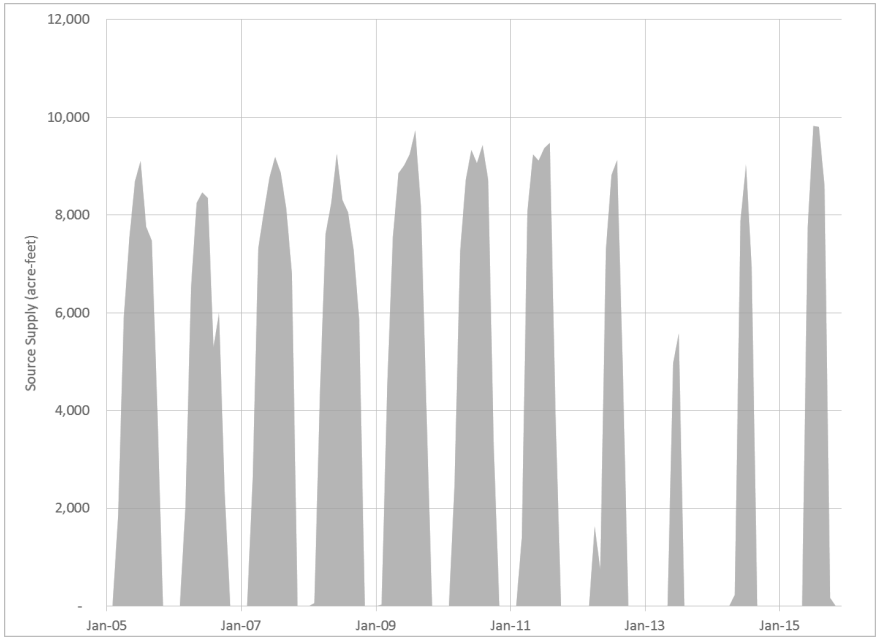
Wastewater Obligations Water Balance

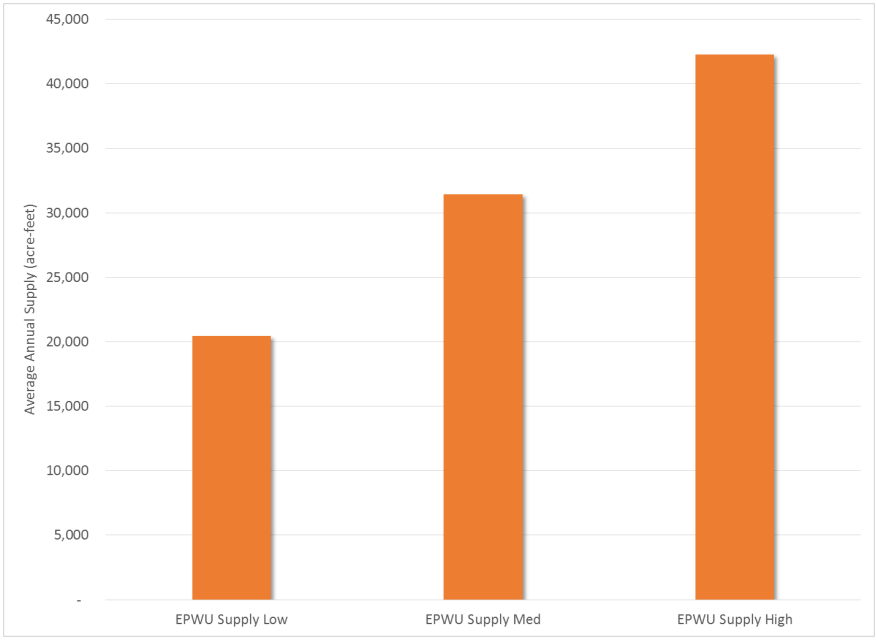
- Contracts with
  - Irrigation district,
  - Power company
  - City parks
  - Golf courses
  - Other reclaimed water customers



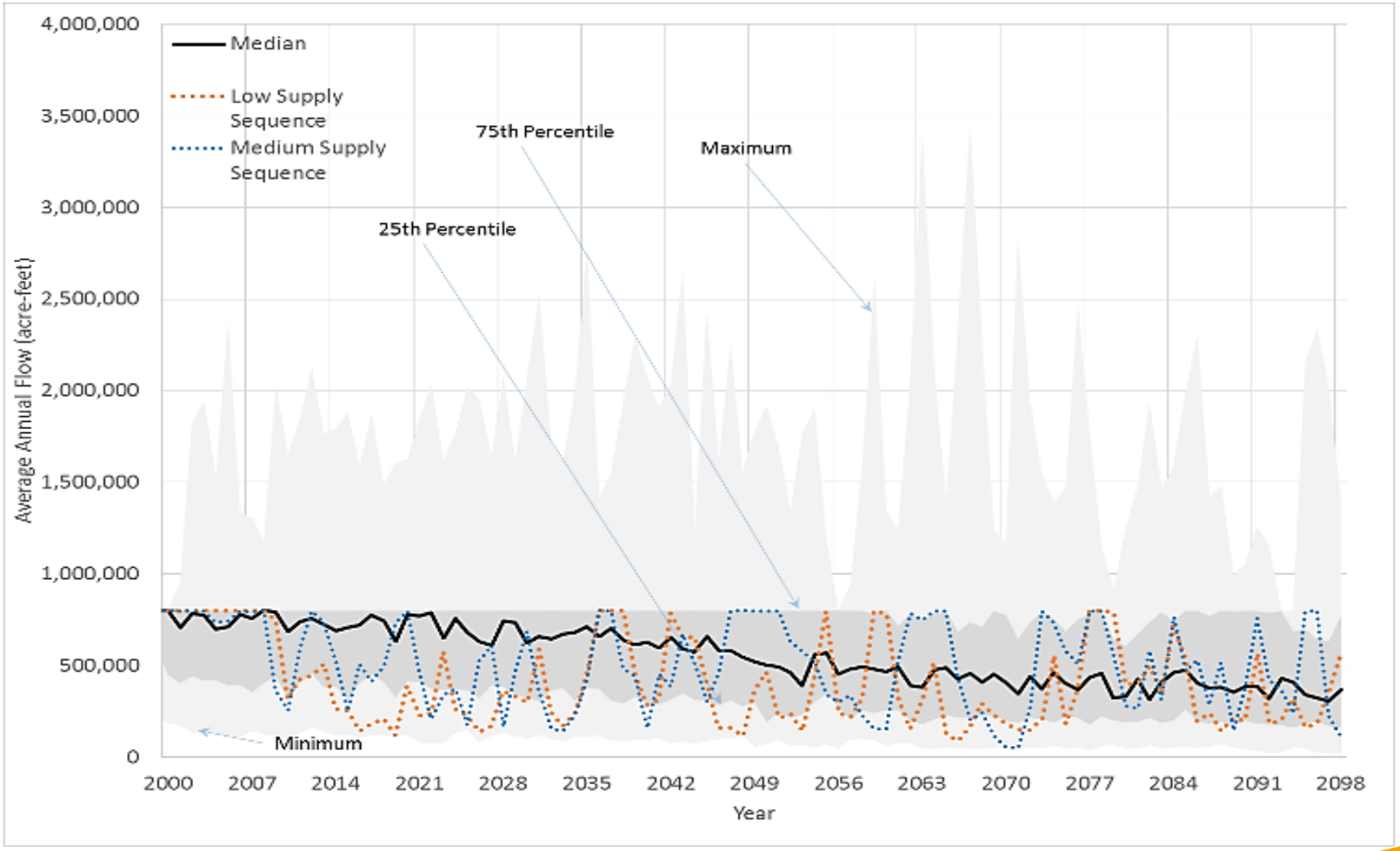
Hydrology: Surface Water Allocation

- 3 scenarios: low, medium, high
  - Historical hydrology and climate variability considered





Hydrology: Climate Variability



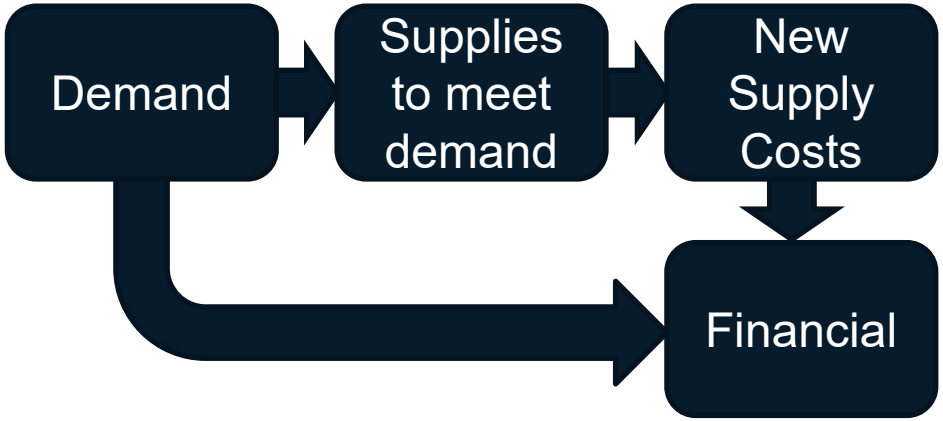
Hydrology: Surface Water Availability

	Annual Allocation (af/acre)							
Month	***0.1 to 0.5***	***0.6 to 1***	***1.1 to 1.5***	***1.6 to 2***	***2.1 to 2.5***	***2.6 to 3***	***3 to 3.5***	***> 3.5***
Jan	0	0	0	0	0	0	0	0
Feb	0	0	0	0	0	0	0	0
Mar	0	0	0	0	0	0	0	0
Apr	0	0	0	0	0	1	1	1
May	0	0	0	1	1	1	1	1
Jun	1	1	1	1	1	1	1	1
Jul	0	0	1	1	1	1	1	1
Aug	0	0	0	0	1	1	1	1
Sep	0	0	0	0	0	0	1	1
Oct	0	0	0	0	0	0	0	1
Nov	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0

WRPT Model

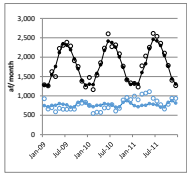
Overview

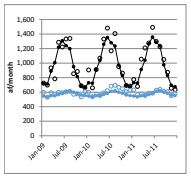
- Four modules developed
- Model plus stand-alone Excel tools
  - Excel demonstrates functionality
  - Not linked to one another
- Dynamic linkage
  - All calculations / logic in Voyage
  - Intuitive input and results

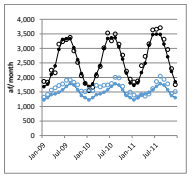


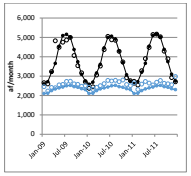
Demand Module

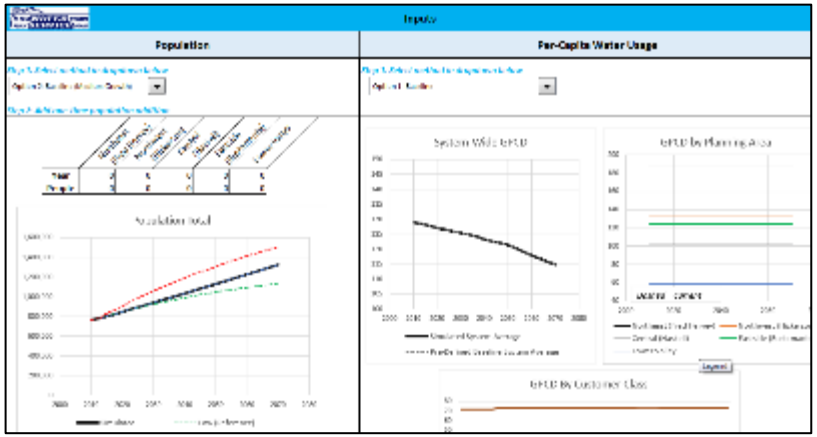
- **Input:** growth and conservation
- **Results:** monthly demand and wastewater production by planning area

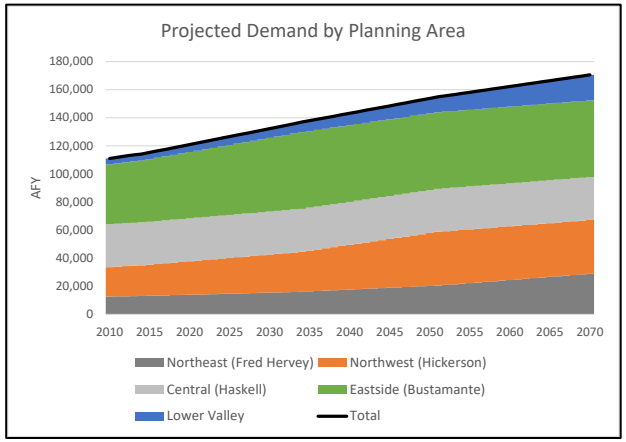






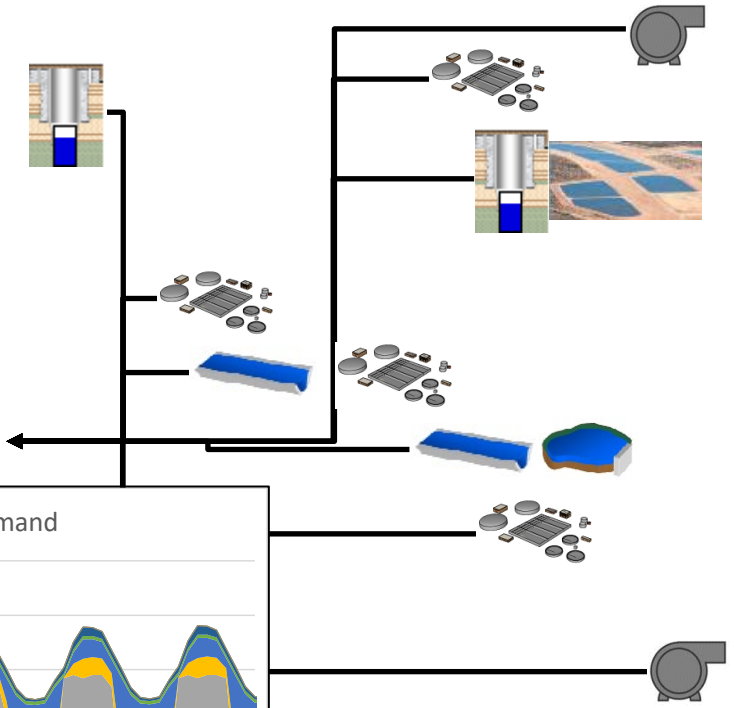


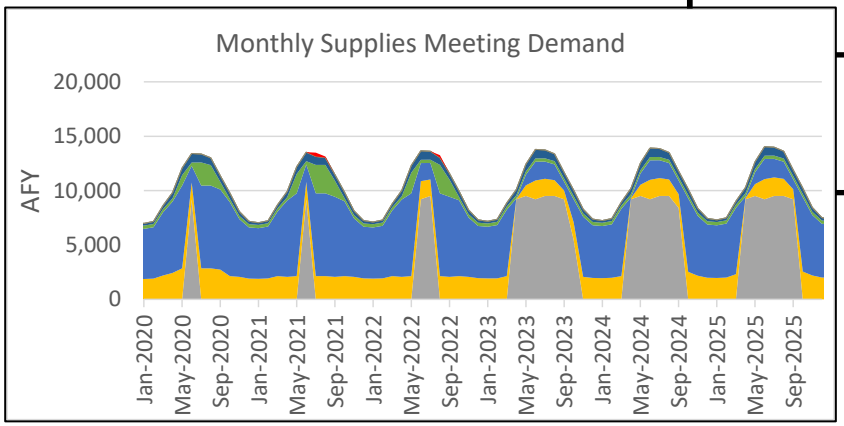




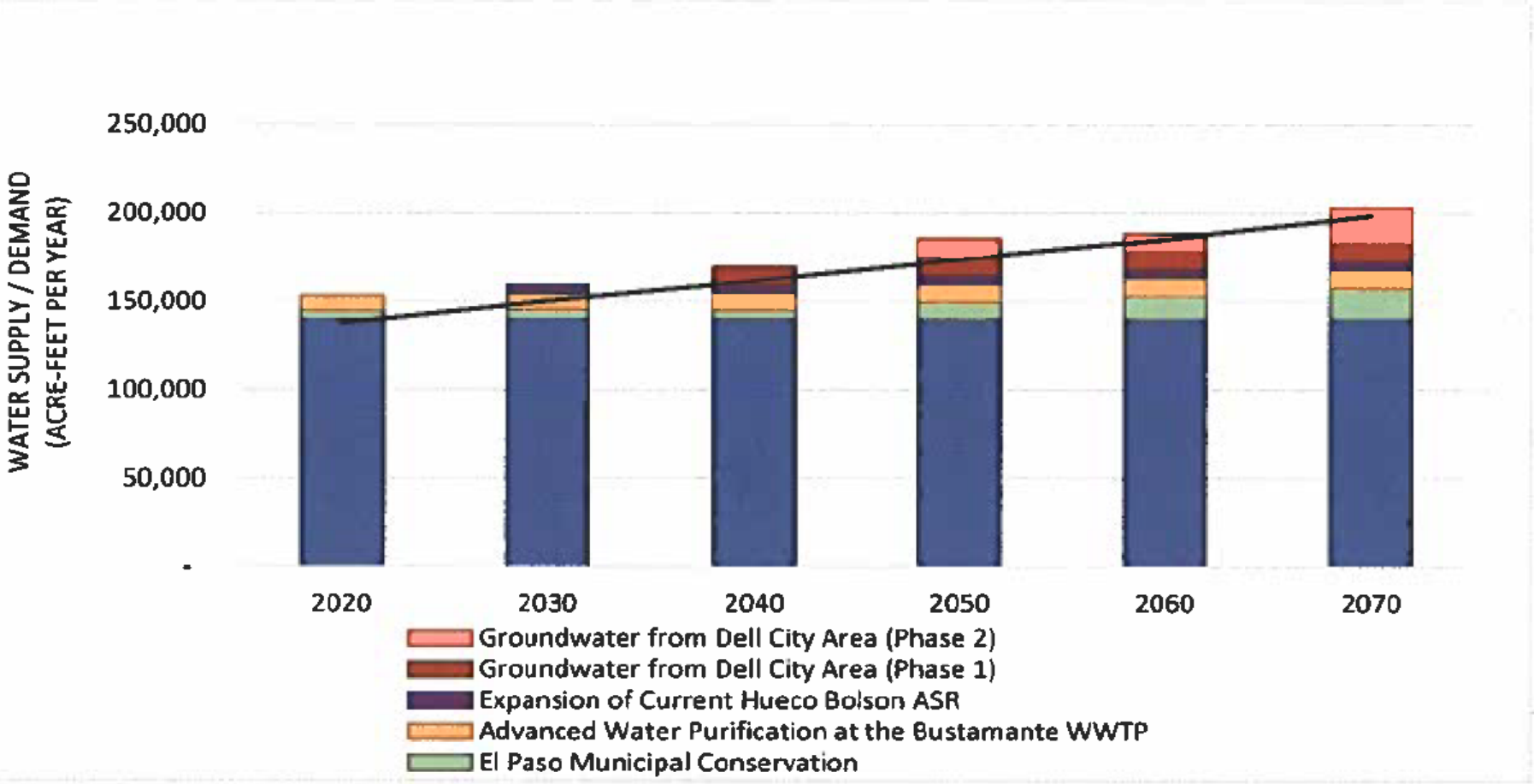
Supply Module

- **Input:** monthly demand by planning area, which supplies are “turned on” (5 existing, 13 potential new)
- **Results:** supplies used to meet demand, and supply gaps





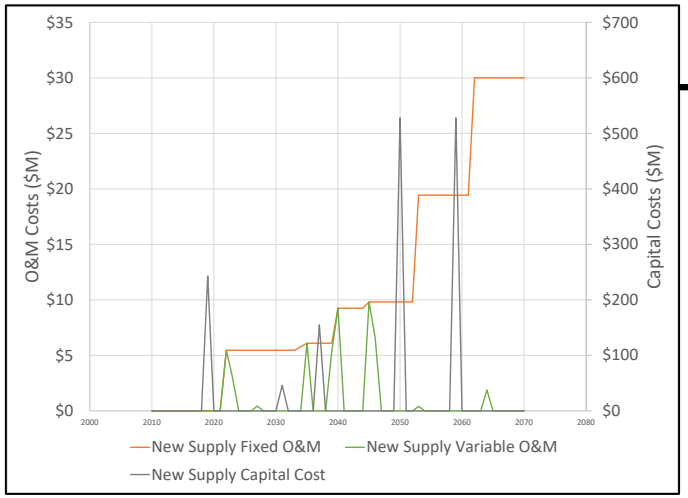
Water Supply Strategies

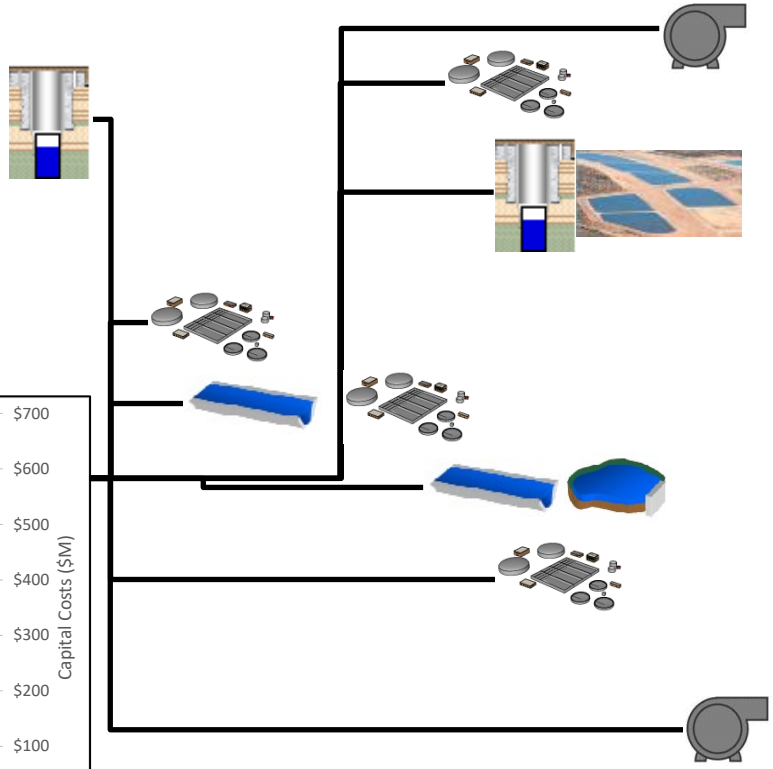


Recommended Water Management Strategies to Meet EPW Projected Water Demands

Cost Module

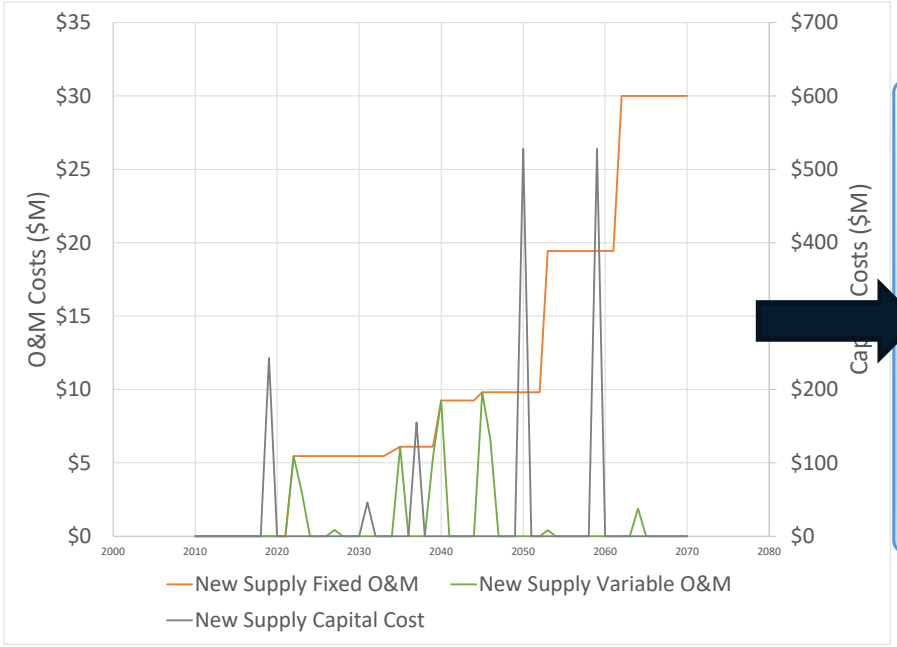
- **Input:** new supply project sizing
- **Results:** new supply capital cost, fixed and variable O&M costs

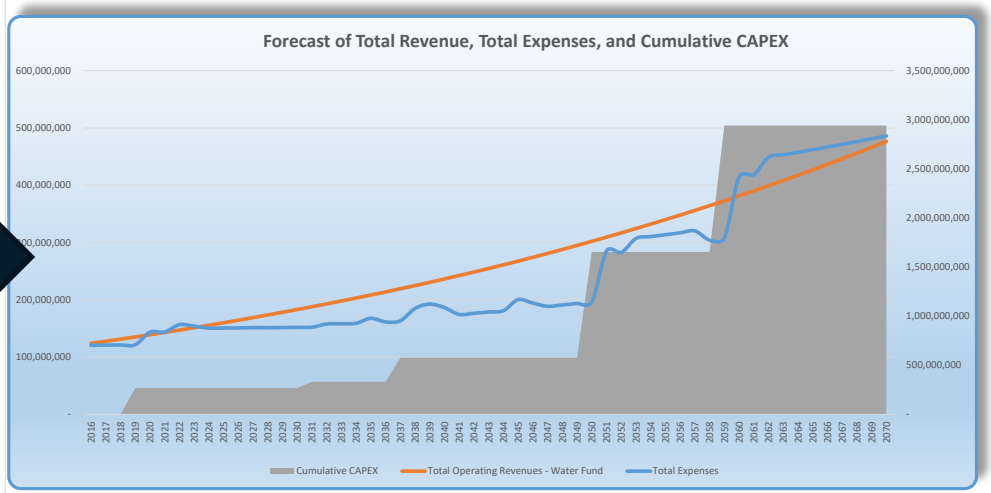




Financial Module

- **Input:** demand, monthly supply by source
- **Results:** revenue and expenses





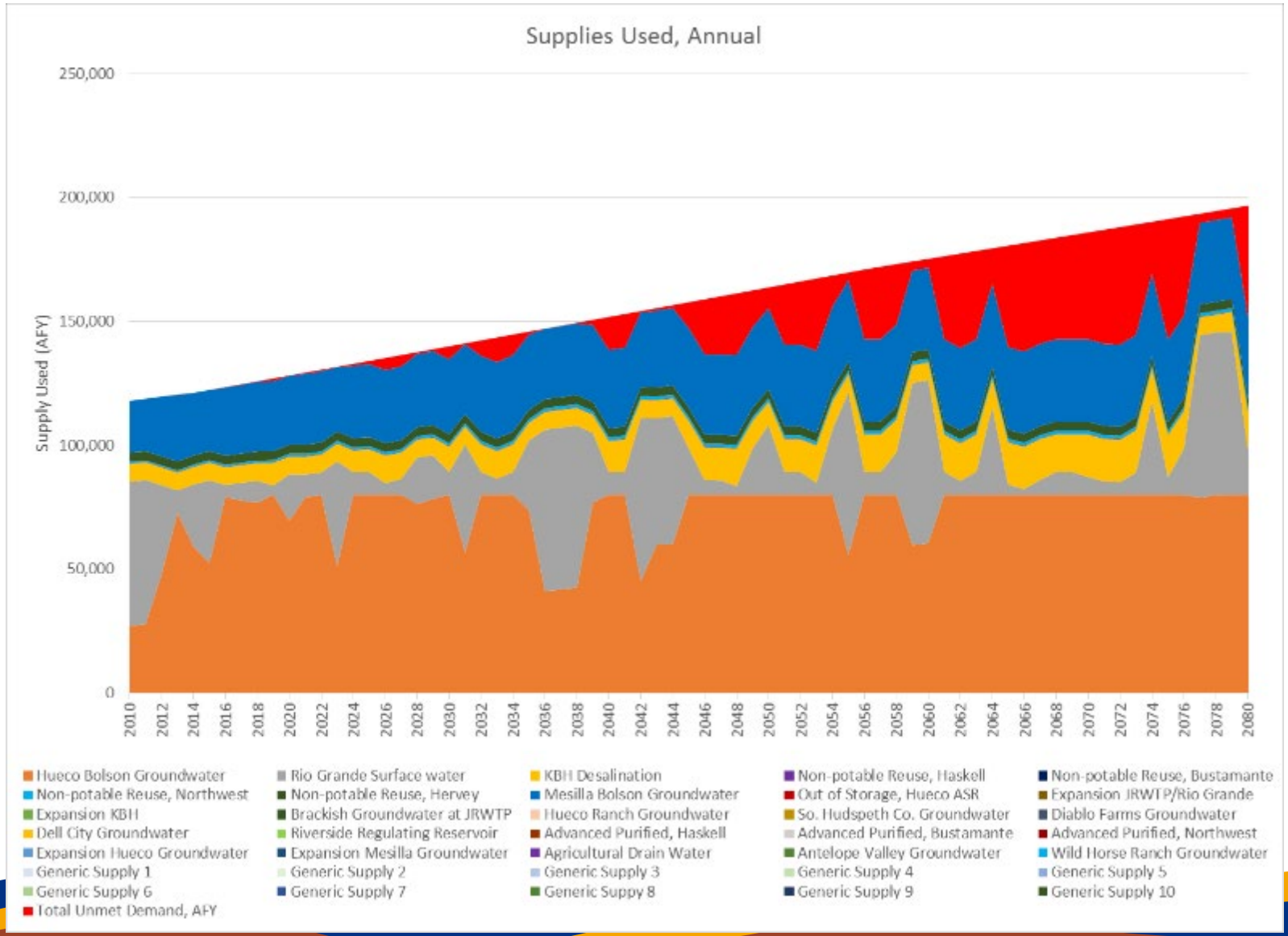
Results

Water Resources Planning Model Results
Pick annual plotting range:
Start year 2010
End year 2080
Click to Update
Demand
Demand Summary Results
Supply
Supply Summary Results
Cost
Cost Summary Results
Financial
Demand_Summary
Supply_Summary
Cost_Summary
Financial_Summary
Data_Import
Plotting

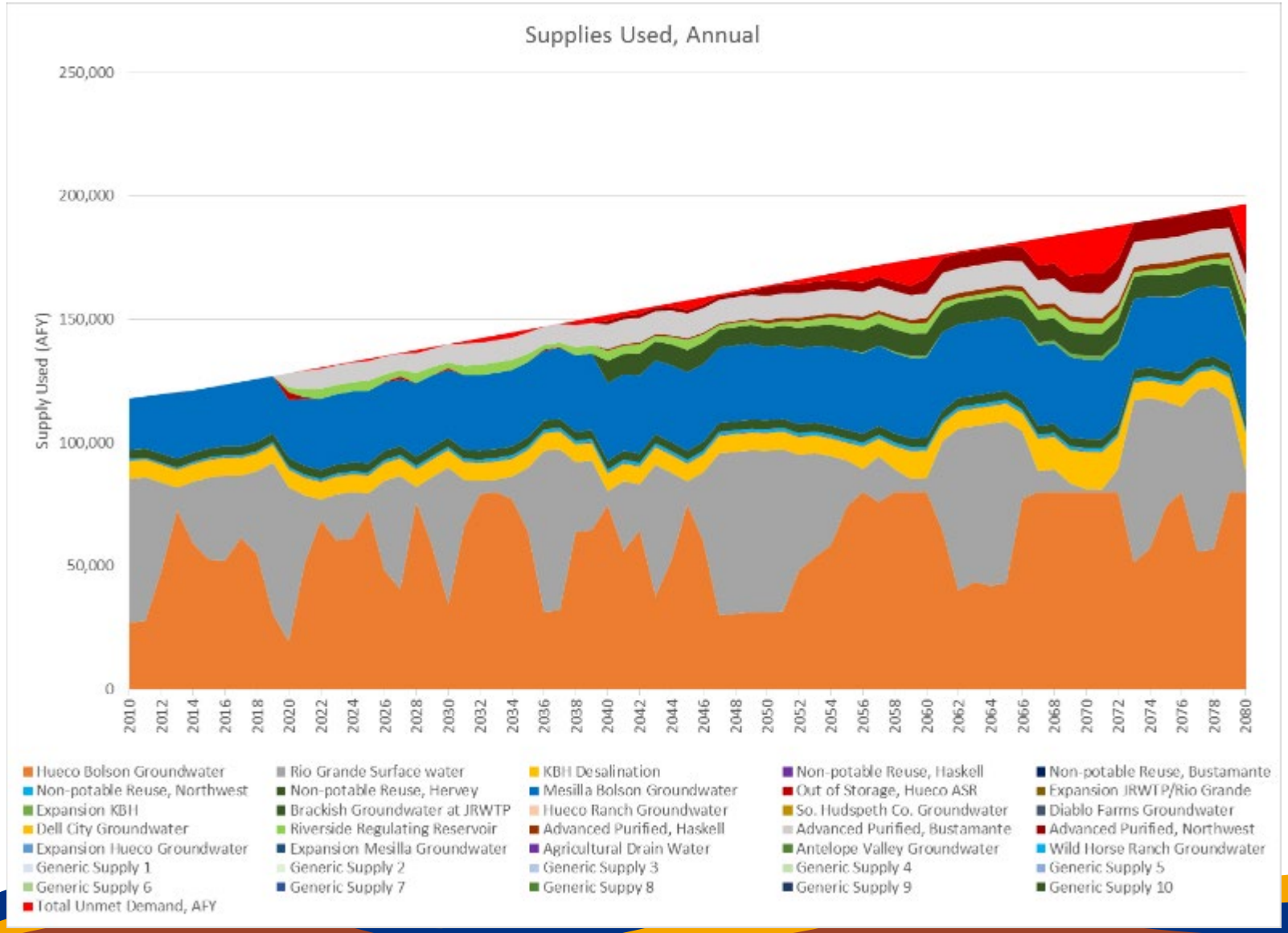
Results

- **Scenario 1** – Baseline
  - Historical river flow, current gpcd (~130), current supplies
- **Scenario 2** – Medium Surface Supply
  - Middle climate variability, current gpcd (~130),
- **Scenario 3** – Low Surface Supply
  - High climate variability supply, current gpcd (~130),
- **Options**
  - local water supplies (Hueco ASR, expand KBH, brackish at JR, riverside reservoir, Advanced purified at all plants)
  - Local water supplies and importation (Dell City in 2040/2060 @ 10,000 and 20,000 afy)
  - 100 gpcd by 2040

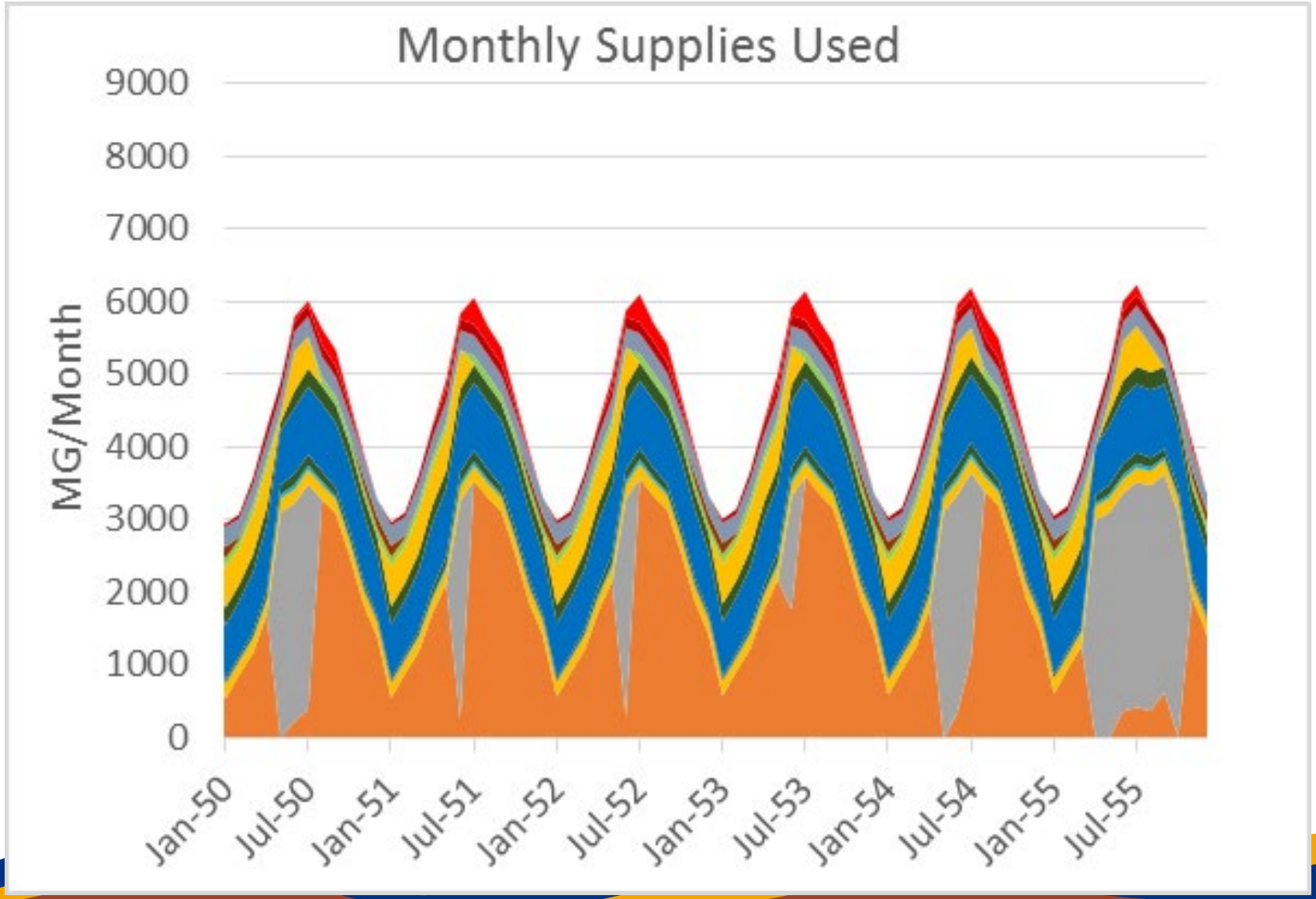
Summary Results – Scenarios 1-3 w/o new supplies



Summary Results – Scenarios 1-3 w/ local supplies



Summary Results – Scenario 3 w/ Dell City in 2040



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