Integrated Water Resources Plan

"Thinking in terms of tomorrow"

June 9, 2015

Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT
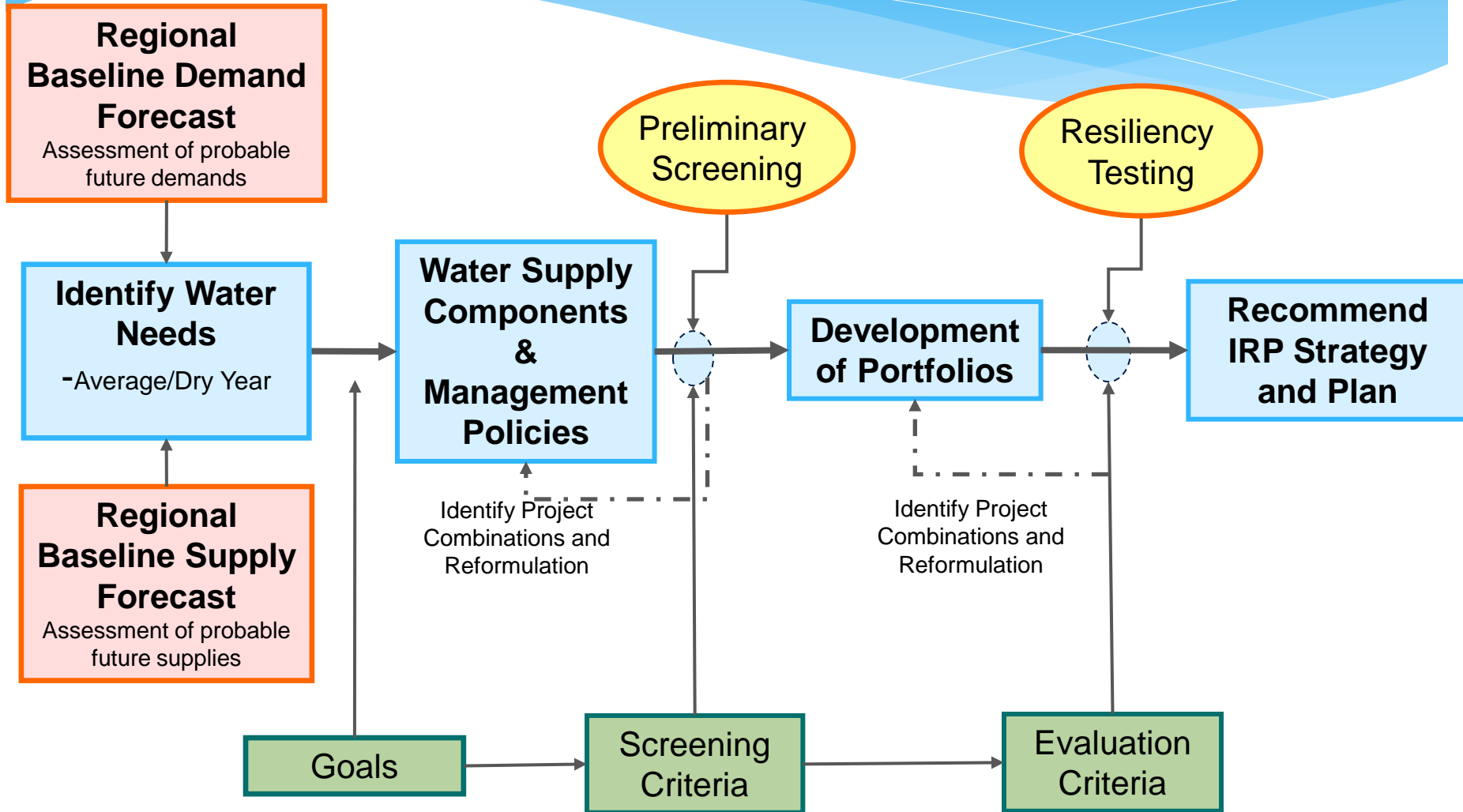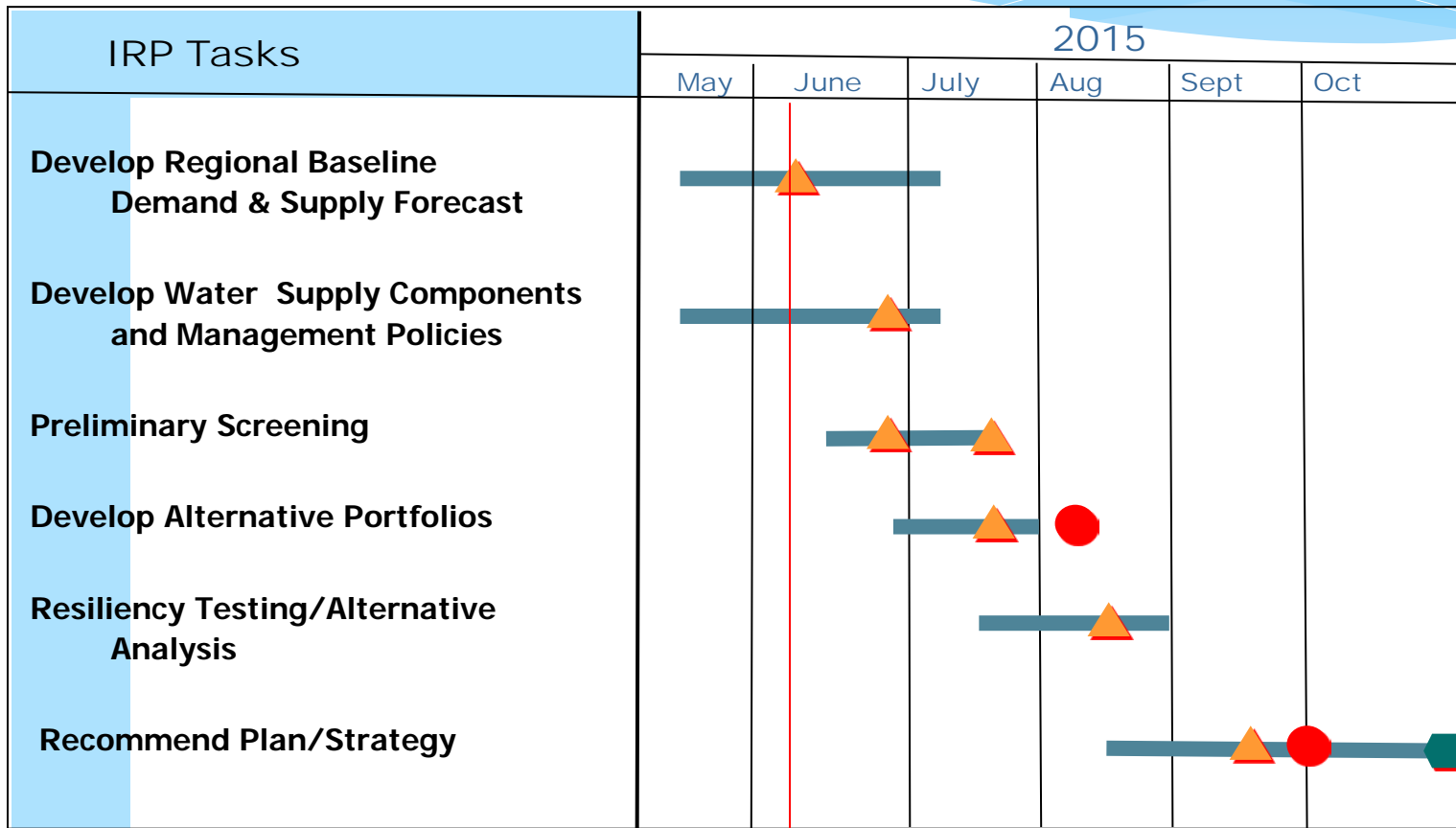
Agenda

Goals of the Meeting

- Provide overview of Integrated Resources Plan (IRP)

- Determine the regional baseline demand forecast for IRP
    - **Receive feedback on demand forecast**

- Introduce the regional baseline supply forecast assumptions

- Introduce draft IRP goals and evaluation criteria

IRP Process Overview

IRP Proposed Schedule

IRP Tasks	2015					
	May	June	July	Aug	Sept	Oct
Develop Regional Baseline Demand & Supply Forecast						
Develop Water Supply Components and Management Policies						
Preliminary Screening						
Develop Alternative Portfolios						
Resiliency Testing/Alternative Analysis						
Recommend Plan/Strategy						

▲ Tech Committee Meetings   ⬤ Joint Policy & Board Workshop

IRP Feedback To Date

- Previous regional baseline demand forecast: too high
- Member agency demand forecasts were not incorporated into regional baseline demand forecast
- Limited member agency input to supply portfolio development
- Lack of transparency in overall planning process
- Specific concern about a portfolio scenario
  - proposed imported water reduction (minimum to zero)

Regional Baseline Demand Forecast

Historical Urban Water Demand

- Population has increased at a greater rate than demands
- Estimated demands for 2015 same as 2000, ~225k AFY
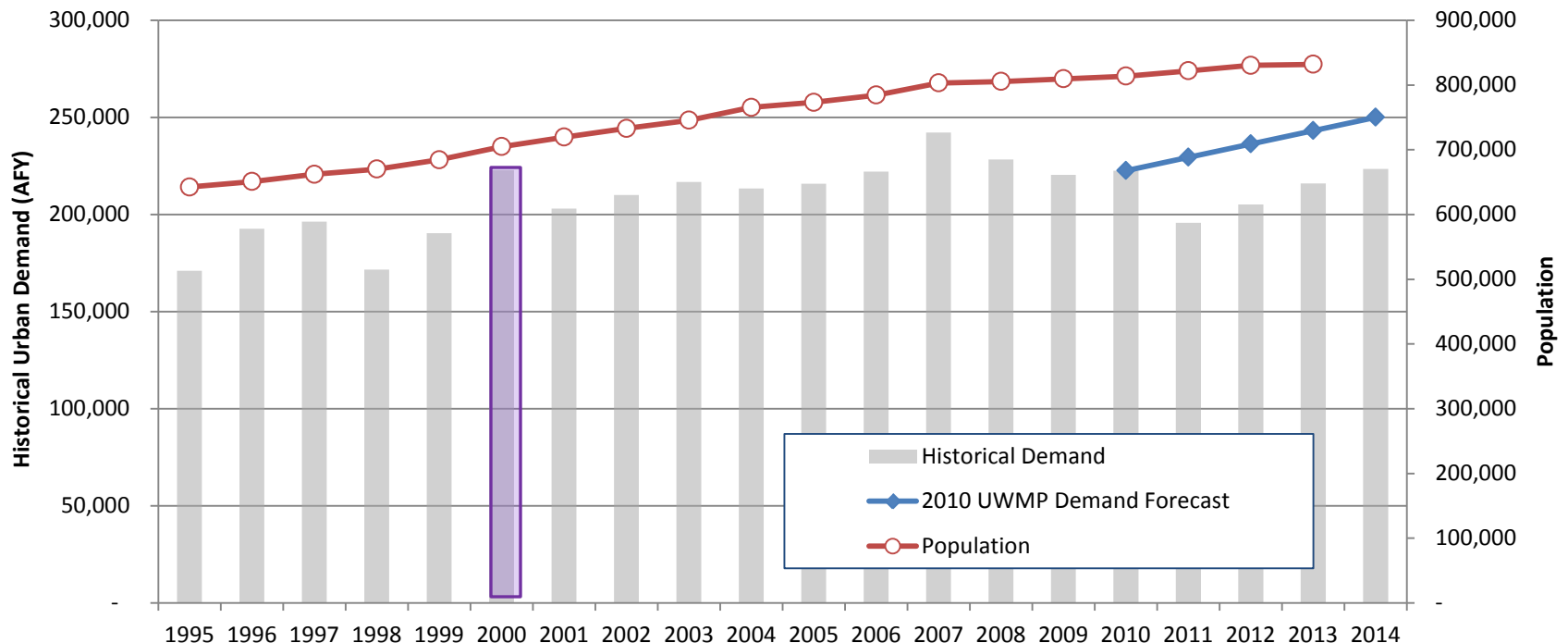
Improvements needed for baseline demand forecast

- Multiple forecast methods were used in 2010 UWMP (each agency uses different approaches)
- Need regional platform that can incorporate regional growth and land use data, that:
    - Is consistent with industry forecasting methods
    - Standardizes the forecast method for the region
    - Is not a "black box", but is open source and adaptable
    - Provides the **foundation for IRP and Regional UWMP**
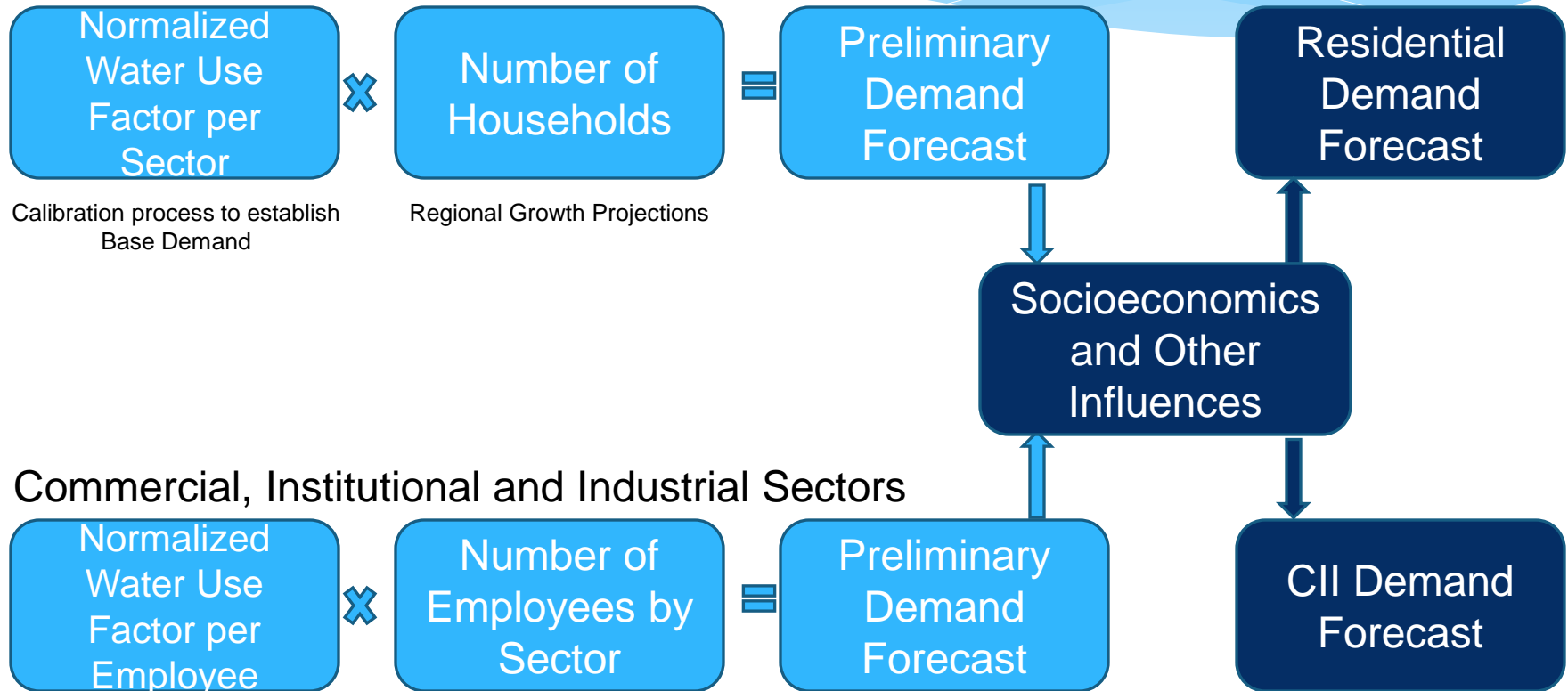
Core Regional Baseline Demand Forecast Elements

- Establish an "Upper" and "Lower" Limit demand forecast
  - Referred to as the **Forecast Envelope**
  - Reflects the need to accommodate future demand uncertainty
  - Characterizes the "range" of needed accommodation, helping to minimize under- or over-investment of capital

- Identify an intermediate demand forecast within the Forecast Envelope
  - Referred to as the **Planning Forecast**
  - Used to evaluate future water supply/management needs

Baseline Demand Model

- Econometric Model driven by regional growth projections
  - "MWD Main" Model used for MWD IRP urban demand forecast
- Includes updated regional demographics (SCAG)
- Incorporates Alliance for Water Efficiency (AWE) model
- Calibrates historical (actual) demand to normalized demand
  - Creates an estimate of what demand "would have been" without influences of weather and employment conditions
- Disaggregates demand into sectors:
  - Single-Family Residential (SFR), Multi-Family Residential (MFR), Commercial/ Industrial/ Institutional (CII) and Other

Baseline Demand Forecast Model Methodology

Single and Multi Family Sectors

Normalized Water Use Factor per Sector **✕** Number of Households **=** Preliminary Demand Forecast

Calibration process to establish Base Demand

Regional Growth Projections

Residential Demand Forecast

Socioeconomics and Other Influences

Commercial, Institutional and Industrial Sectors

Normalized Water Use Factor per Employee **✕** Number of Employees by Sector **=** Preliminary Demand Forecast

CII Demand Forecast

Normalized Demand: Removes influences of weather & economy

Regional Normalized Water Demand

Actual versus Normalized Demand (Acre-Foot)
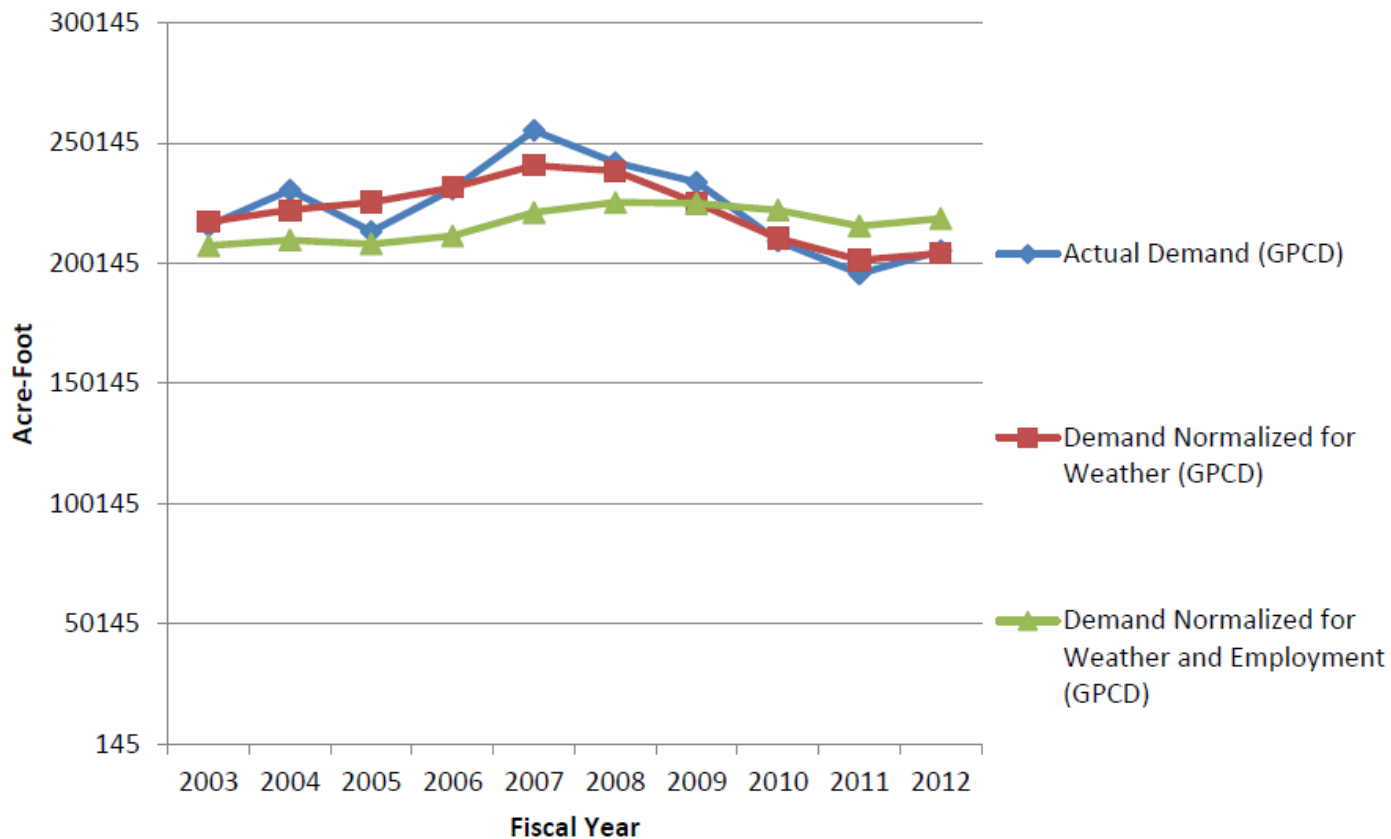
What Impacts Future Water Use Factors?

- Weather*, climate, economy*, socioeconomics, water use behavior* & **housing density/design**

- **Housing density/design** has the single largest impact on water use

- "Smart Growth" developments:
  - Consistent with state law/local ordinances (landscape requirements & water efficiencies)
  - Use less water than traditional (pre-2000) construction
  - Example: Chino Preserve; also indoor data from Regional Wastewater Flow study and BIA assessment of lower outdoor usage

Sector	Low Density	Avg Density	High Density
Single Family (gal/unit-day)	574	555	502
Multi Family (gal/unit-day)	286	281	258

*influence determined from calibration process with historical data

Recommended Range for Regional Baseline Demand

The **Forecast Envelope** for long term demands set by:

- **Upper Limit:** Used City General Plans housing density to update MWD Main density factors
  - Overlaid 2012 SCAG Regional Transportation Plan average housing density to confirm General Plan density projections are similar to the SCAG projections

- **Lower Limit:** Used 2012 SCAG Regional Transportation Plan
  - Used a "Smart Growth" scenario for estimating higher housing density (with lower water use factors)
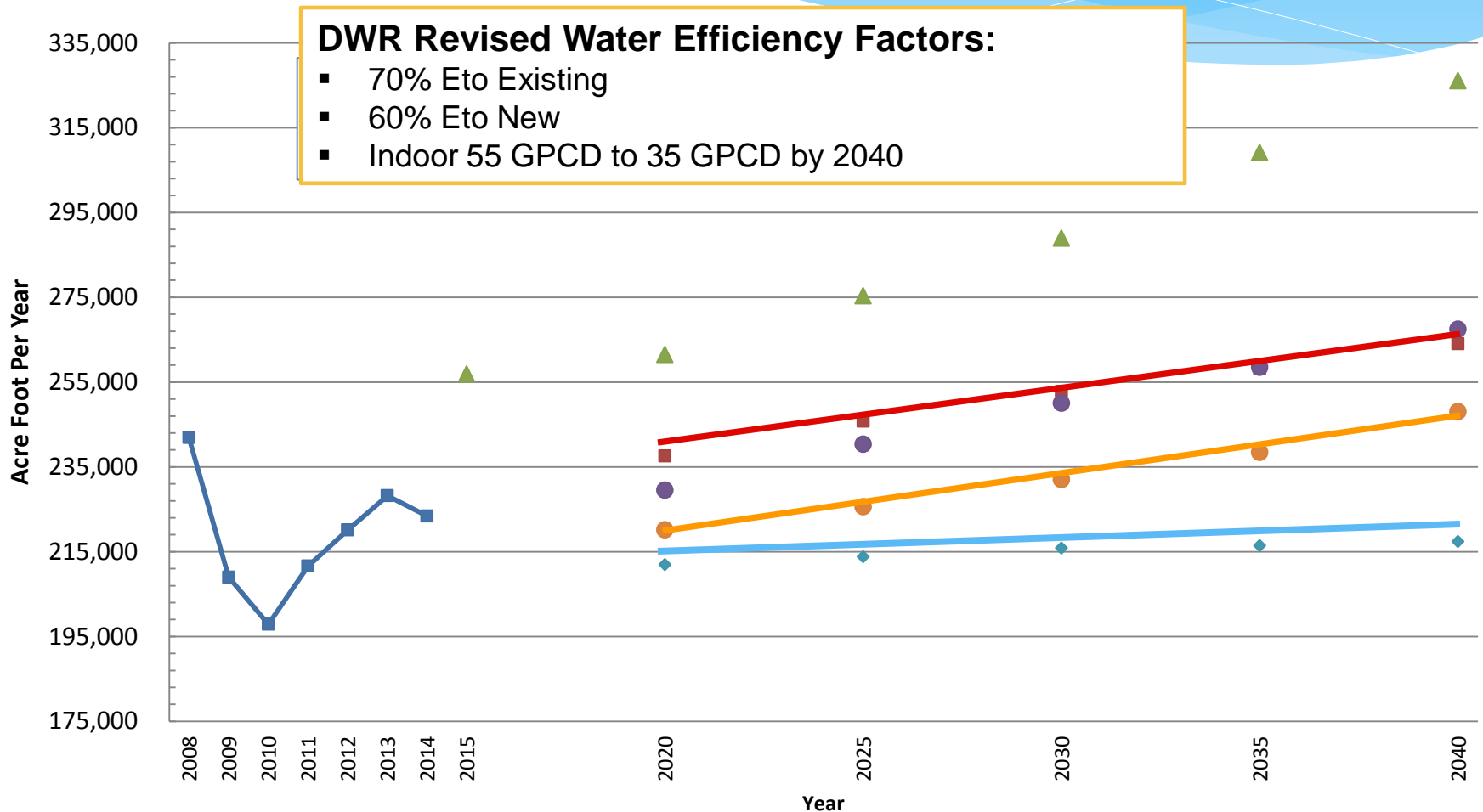
Regional Baseline Demand Forecast Envelope
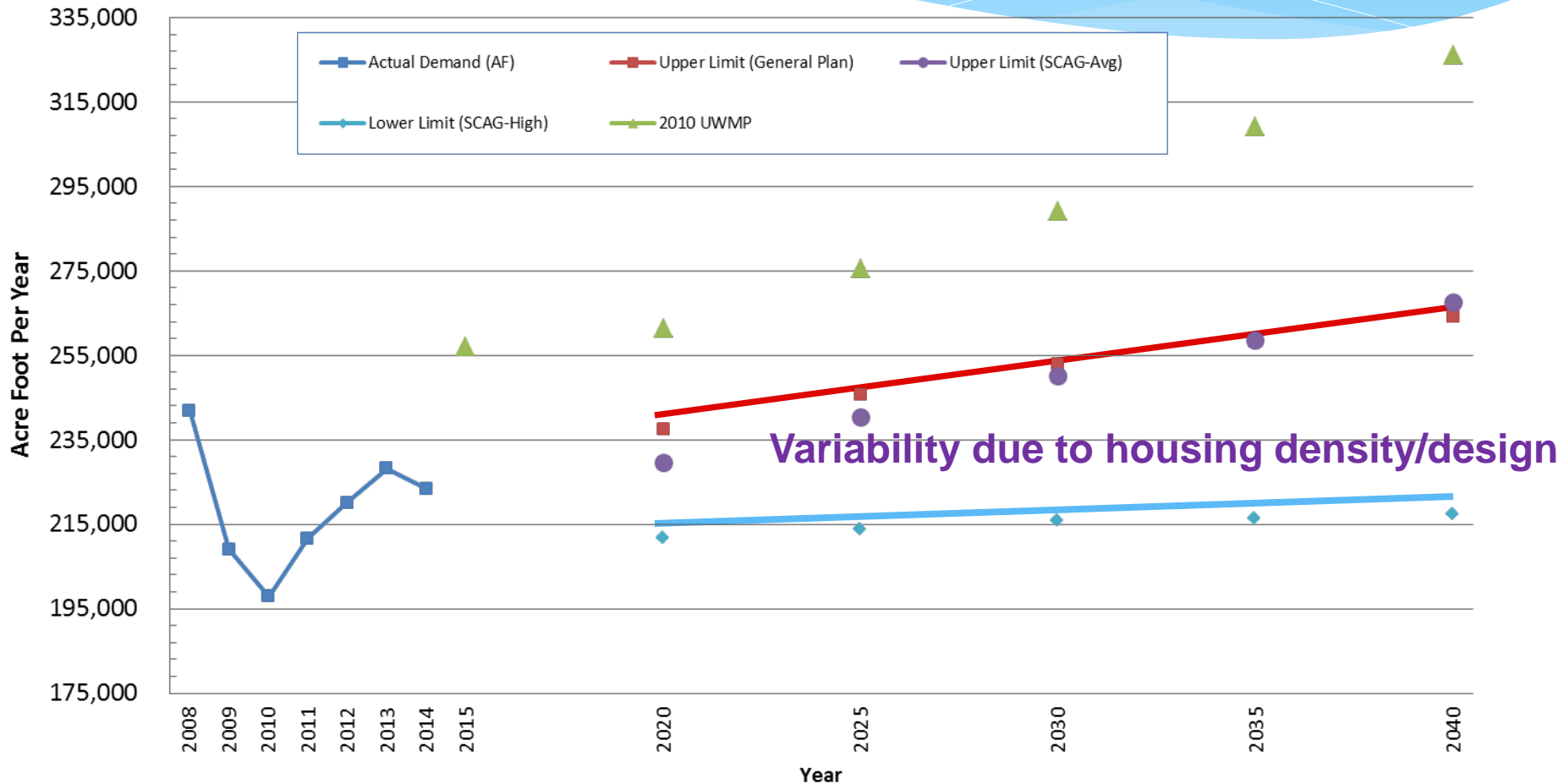
Baseline Demand Forecast Planning Forecast
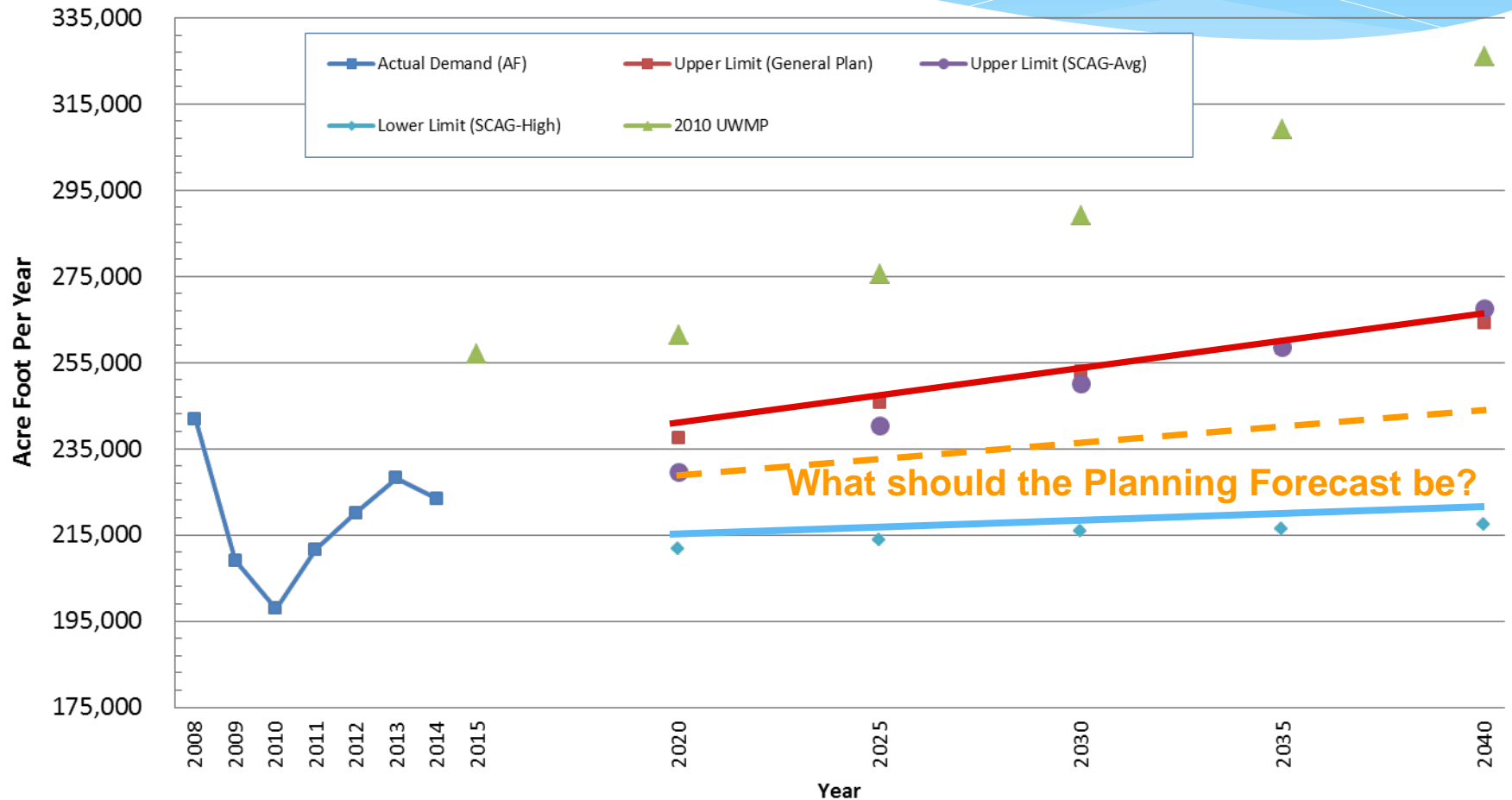
Recommendation:
Use DWR Revised Water Efficiency Factors For Planning Forecast

DWR Revised Water Efficiency Factors:
- 70% Eto Existing
- 60% Eto New
- Indoor 55 GPCD to 35 GPCD by 2040

Regional Baseline Demand Forecast Summary
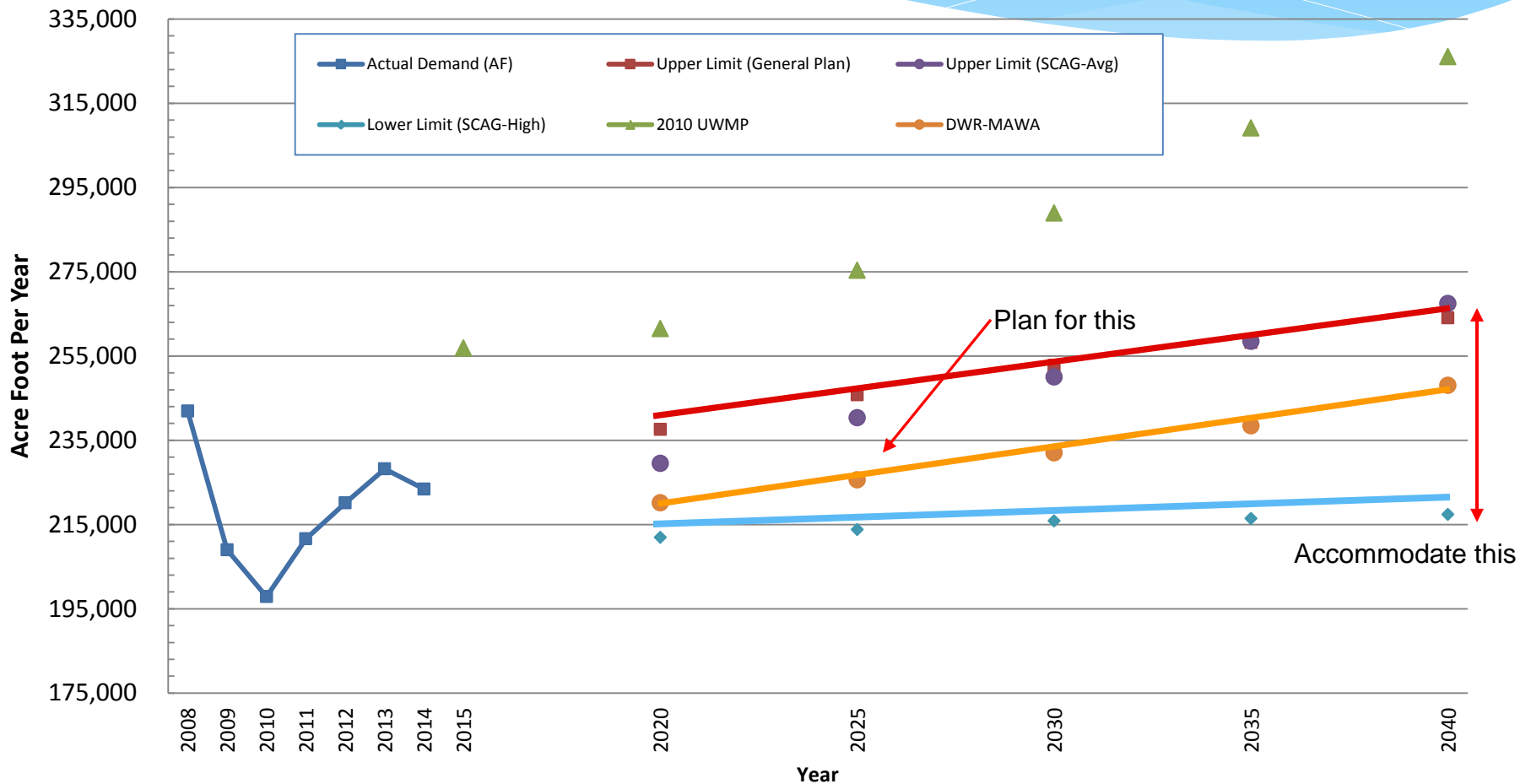
Baseline Demand Forecast Recommendation

- **Planning Forecast**
  - Evaluate Regional supply/water management needs and investments for 2015 IRP
  - Established by DWR Revised Water Efficiency Factors

- Accommodate for demand uncertainty as defined by the **Forecast Envelope**, constrained by:
  - **Upper Limit**: potential increase in water need
  - **Lower Limit**: potential decrease in water need

Regional Baseline Supply Assumptions
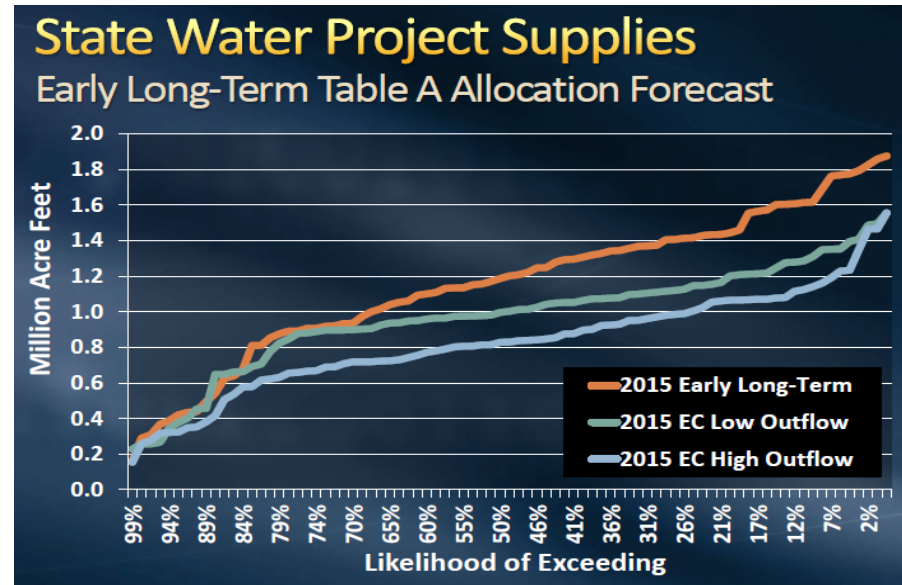
Baseline Supply Assumptions:

- Characterize AVERAGE supply based on existing project commitments
- Characterize future CHANGES in the average year supplies
  - Consider targets for near, mid and long term periods
- Resilience testing will be done to determine variability in average year supplies and need for additional actions

Baseline Supply Assumptions: Groundwater

- Chino Basin Groundwater:
  - 2015 – 2020: 91k AF (5-yr average)
  - 2020 – 2030 and 2030 - 2040: 87k AF
    - 130k AF Chino Basin with IEUA Appropriators receiving ~74%

- Non Chino Basin Groundwater: 22k AF (5-yr average)
  - No changes to 2040

- Chino Basin Desalter: 20k AF
  - 2015 – 2020 and 2020 - 2030: 20k AF
    - Phase III Expansion to 35k AF with IEUA Appropriators receiving ~57%
  - 2030 – 2040: <20k AF due to replenishment?

Baseline Supply Assumptions: Imported Water

- Current MWD IW Tier 1 allocation: 69.7k AF
  - 2015 – 2020: 57k AF (5-year average)
  - 2020 – 2030: 52k AF (75% of Tier 1 allocation)
  - 2030 – 2040: <52k AF?

State Water Project Supplies
Early Long-Term Table A Allocation Forecast

- 2015 Early Long-Term
- 2015 EC Low Outflow
- 2015 EC High Outflow

Baseline Supply Assumptions: Local Surface

- Local Surface: 11.7k AF (5-yr average)
  - No changes to 2040

	09/10	10/11	11/12	12/13	13/14
Local Surface	13,110	18,761	16,744	5,980	3,658

Baseline Supply Assumptions: Recycled Water

- Direct use:
    - 2015 – 2020: 25k AF
    - 2020 – 2030 and 2030 – 2040 : 31.3k AF

- RW Recharge for Groundwater:
    - 2015 – 2020: 17k AF
    - 2020 – 2030 and 2030 – 2040 : 18.7k AF

- SAR Obligation: 17,000 AF to 2040

Forecast per 2013 Recharge Master Plan Update, 2015 Recycled Water Program Strategy; post 2025 to be evaluated by IRP

Baseline Supply Assumptions: Conservation/WUE

- Water savings considered an offset to demand and are tracked as a "water supply"

- Assumed current annual savings from active programs (as of 2014) will continue through 2040

  - Active = 5,700 AFY through existing programs

  - Passive= Varies

    - Baseline demand forecasts includes future code based savings

  - **Total Savings = ~7,350 AFY,**

    - Already included in baseline demand forecasts

Baseline Supply Assumptions: Stormwater

- ## Stormwater Recharge for Groundwater: 12,000 AF
  - ### No change to 2040

Table 7-8
Water Budget for Chino Basin (2012-2035)
Scenario 3A
(acre-ft)

| End of Fiscal Year	Recharge Components										Discharge Components							Recharge minus Discharge	Annual Developed Yield	Ten-Year Developed Yield
	Subsurface Boundary Inflow, Clockwise from the Chino Hills thru Rialto Basin	Subsurface Boundary Inflow from Bloomington Divide	Subsurface Inflow From Temescal	Deep Infiltration of Precipitation and Applied Water	Streambed Infiltration from Santa Ana River Tributaries	Storm Water Recharge in Basins	Recycled Water	Imported Water	Streambed Infiltration in the Santa Ana River	Subtotal Recharge	CDA Pumping	Pool 2 and 3 Pumping	Pool 1 Pumping	ET	GW Discharge to Streams	Subsurface Discharge to Temescal Basin	Subtotal Discharge			
2012	19,106	8,153	5,793	91,034	1,081	12,000	8,634	3,996	39,322	189,119	28,940	102,447	22,398	17,968	15,502	3,527	190,782	-1,663	139,492	132,009
2013	19,106	8,153	5,438	90,222	1,084	12,000	8,200	3,996	39,481	187,679	28,940	103,830	19,000	18,005	15,965	3,708	189,448	-1,769	137,805	133,026
2014	19,106	8,153	5,198	91,461	1,087	12,000	9,300	3,996	37,389	187,689	28,940	105,212	15,000	18,121	17,287	3,767	188,327	-638	135,218	133,983
2015	19,106	8,153	5,226	91,547	1,089	12,000	14,500	3,996	34,544	190,161	39,400	106,595	13,000	18,210	19,142	3,773	200,120	-9,959	130,540	133,804
2016	19,106	8,153	5,418	95,442	1,092	12,000	14,500	3,996	34,790	194,497	39,400	108,125	11,400	18,223	19,145	3,746	200,038	-5,541	134,888	134,045
2017	19,106	8,153	5,548	96,217	1,095	12,000	14,500	3,996	34,747	195,362	39,400	109,655	9,800	18,233	19,210	3,724	200,022	-4,660	135,696	135,403
2018	19,106	8,153	5,617	96,701	1,098	12,000	16,900	3,996	34,567	198,137	39,400	111,184	8,200	18,252	19,361	3,710	200,108	-1,970	135,918	135,798
2019	19,106	8,153	5,655	95,550	1,101	12,000	16,900	3,996	34,274	196,734	39,400	112,714	6,600	18,279	19,578	3,705	200,276	-3,541	134,277	135,975
2020	19,106	8,153	5,681	94,196	1,104	12,000	16,900	3,996	33,936	195,072	39,400	114,244	5,000	18,305	19,794	3,705	200,448	-5,377	132,372	135,369
2021	19,106	8,153	5,686	92,627	1,106	12,000	16,900	3,996	33,814	193,389	39,400	116,444	5,000	18,303	19,864	3,709	202,720	-9,331	130,618	134,683
2022	19,106	8,153	5,680	91,880	1,109	12,000	18,700	3,996	33,826	194,451	39,400	118,644	5,000	18,269	19,811	3,717	204,861	-10,410	129,938	133,727
2023	19,106	8,153	5,668	93,269	1,112	12,000	18,700	3,996	33,868	195,872	39,400	120,844	5,000	18,269	19,726	3,727	206,966	-11,094	131,454	133,092
2024	19,106	8,153	5,652	93,505	1,115	12,000	18,700	3,996	34,013	196,240	39,400	123,044	5,000	18,258	19,598	3,737	209,037	-12,797	131,951	132,765
2025	19,106	8,153	5,636	94,349	1,118	12,000	18,700	3,996	34,163	197,221	39,400	125,244	5,000	18,247	19,462	3,746	211,099	-13,878	133,070	133,018
2026	19,106	8,153	5,620	94,886	1,121	12,000	18,700	3,996	34,339	197,921	39,400	127,367	5,000	18,232	19,302	3,757	213,060	-15,139	133,932	132,923
2027	19,106	8,153	5,604	94,712	1,124	12,000	18,700	3,996	34,509	197,903	39,400	129,489	5,000	18,221	19,152	3,767	215,030	-17,127	134,067	132,760
2028	19,106	8,153	5,591	94,647	1,126	12,000	18,700	3,996	36,502	199,822	39,400	131,612	5,000	18,198	17,768	3,776	215,756	-15,934	137,382	132,906
2029	19,106	8,153	5,576	95,284	1,129	12,000	18,700	3,996	36,731	200,675	39,400	133,735	5,000	18,184	17,589	3,785	217,693	-17,017	138,421	133,320
2030	19,106	8,153	5,562	95,372	1,132	12,000	18,700	3,996	36,548	200,569	39,400	135,857	5,000	18,167	17,538	3,795	219,758	-19,189	138,372	133,920
2031	19,106	8,153	5,547	96,018	1,132	12,000	18,700	0	37,215	197,871	39,400	137,838	5,000	18,149	17,198	3,802	221,387	-23,517	140,022	134,861
2032	19,106	8,153	5,534	94,914	1,132	12,000	18,700	0	37,847	197,386	39,400	139,820	5,000	18,129	16,719	3,806	222,874	-25,488	140,031	135,870
2033	19,106	8,153	5,522	95,190	1,132	12,000	18,700	0	37,750	197,553	39,400	141,801	5,000	18,109	16,743	3,811	224,864	-27,311	140,190	136,744
2034	19,106	8,153	5,512	96,204	1,132	12,000	18,700	0	37,264	198,071	39,400	143,782	5,000	18,087	16,759	3,816	226,845	-28,774	140,708	137,619
2035	19,106	8,153	5,501	95,863	1,132	12,000	18,700	0	37,797	198,251	39,400	145,763	5,000	18,061	16,459	3,822	228,505	-30,253	141,210	138,433
Statistics through 2030																				
Total	363,014	154,907	105,847	1,782,900	21,023	228,000	305,534	75,924	671,364	3,708,513	717,220	2,236,287	160,398	345,967	354,795	70,881	3,885,548	-177,035	2,555,412	na
Total (%)	10%	4%	3%	48%	1%	6%	8%	2%	18%	100%	19%	60%	4%	9%	10%	2%	105%	na	na	na
Average	19,106	8,153	5,571	93,837	1,106	12,000	16,081	3,996	35,335	195,185	37,748	117,699	8,442	18,209	18,673	3,731	204,503	-9,318	134,495	133,817
Median	19,106	8,153	5,617	94,349	1,106	12,000	16,900	3,996	34,544	195,872	39,400	116,444	5,000	18,233	19,210	3,737	202,720	-9,959	134,277	133,727
Maximum	19,106	8,153	5,793	96,701	1,132	12,000	18,700	3,996	39,481	200,675	39,400	135,857	22,398	18,305	19,864	3,795	219,758	-638	139,492	135,975
Minimum	19,106	8,153	5,198	90,222	1,081	12,000	8,200	3,996	33,814	187,679	28,940	102,447	5,000	17,968	15,502	3,527	188,327	-19,189	129,938	132,009

- (Per Water Budget Scenario 3A (Table 7-8 per 01/2014 Chino Basin Watermaster Model Update report)

Available Average Year Baseline Supplies

| Supply Type	AF by 2020
Chino Groundwater	91,000
Recycled Water Direct Use	25,000
Chino Desalter	20,000
Surface & Non-Chino Groundwater	33,700
Imported Water	57,000
Conservation and WUE	0*
Total Baseline Supply by 2020	**226,700**

*Already included in the Baseline Demand Forecasts
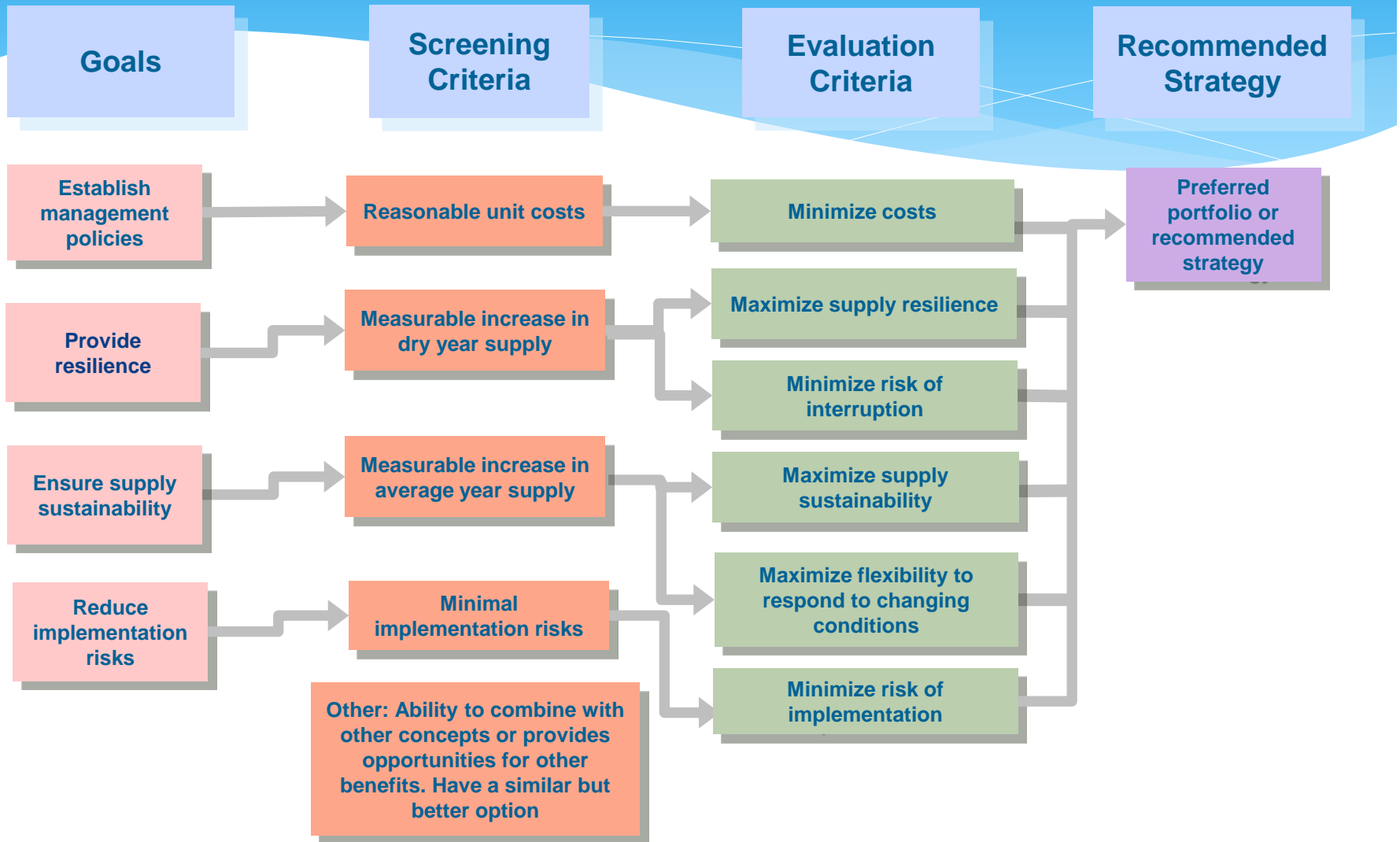
Preliminary Water Needs Assessment
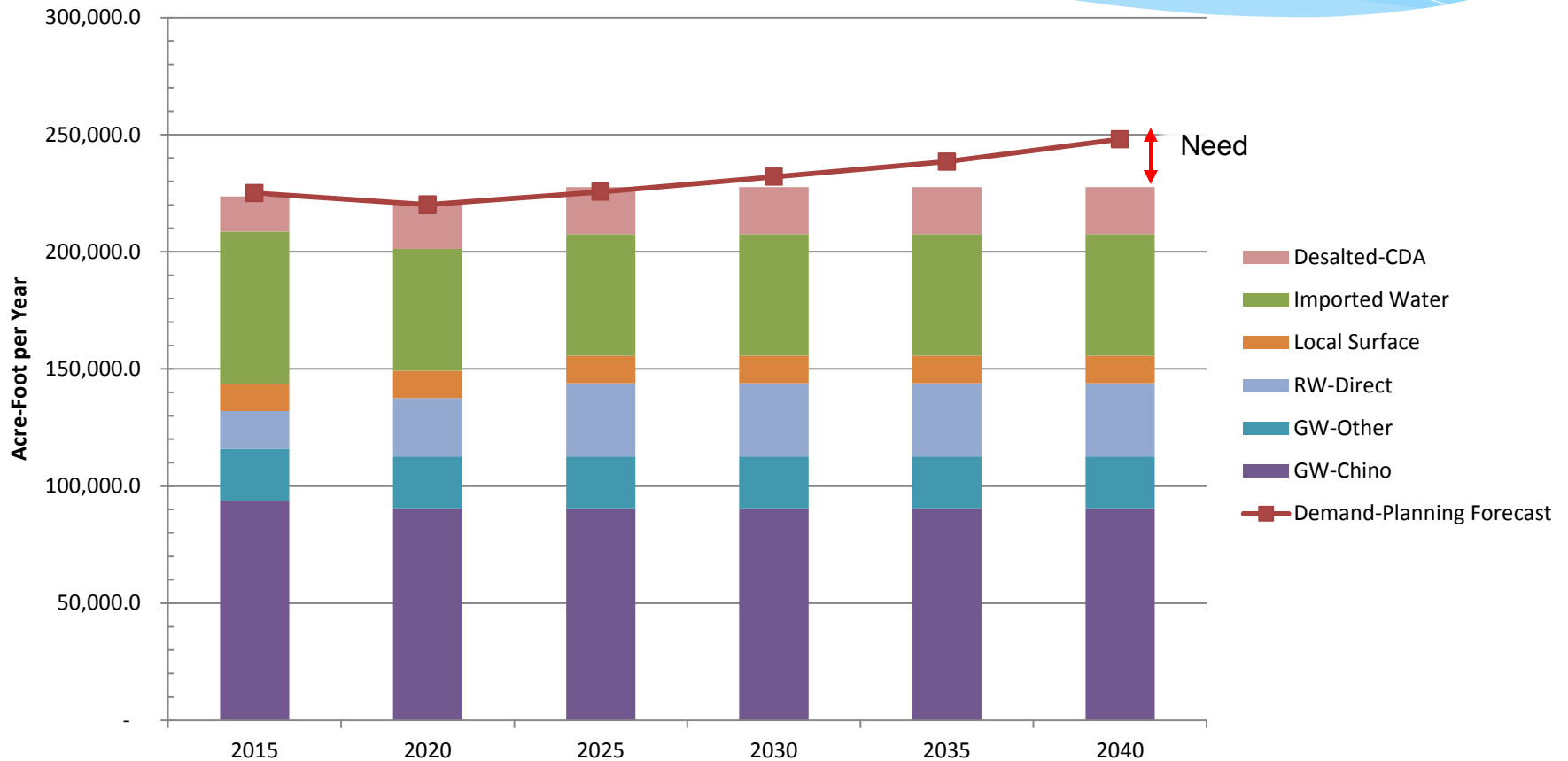
Uncertainty in Baseline Supply

This will be determined after resiliency testing and development of management policies
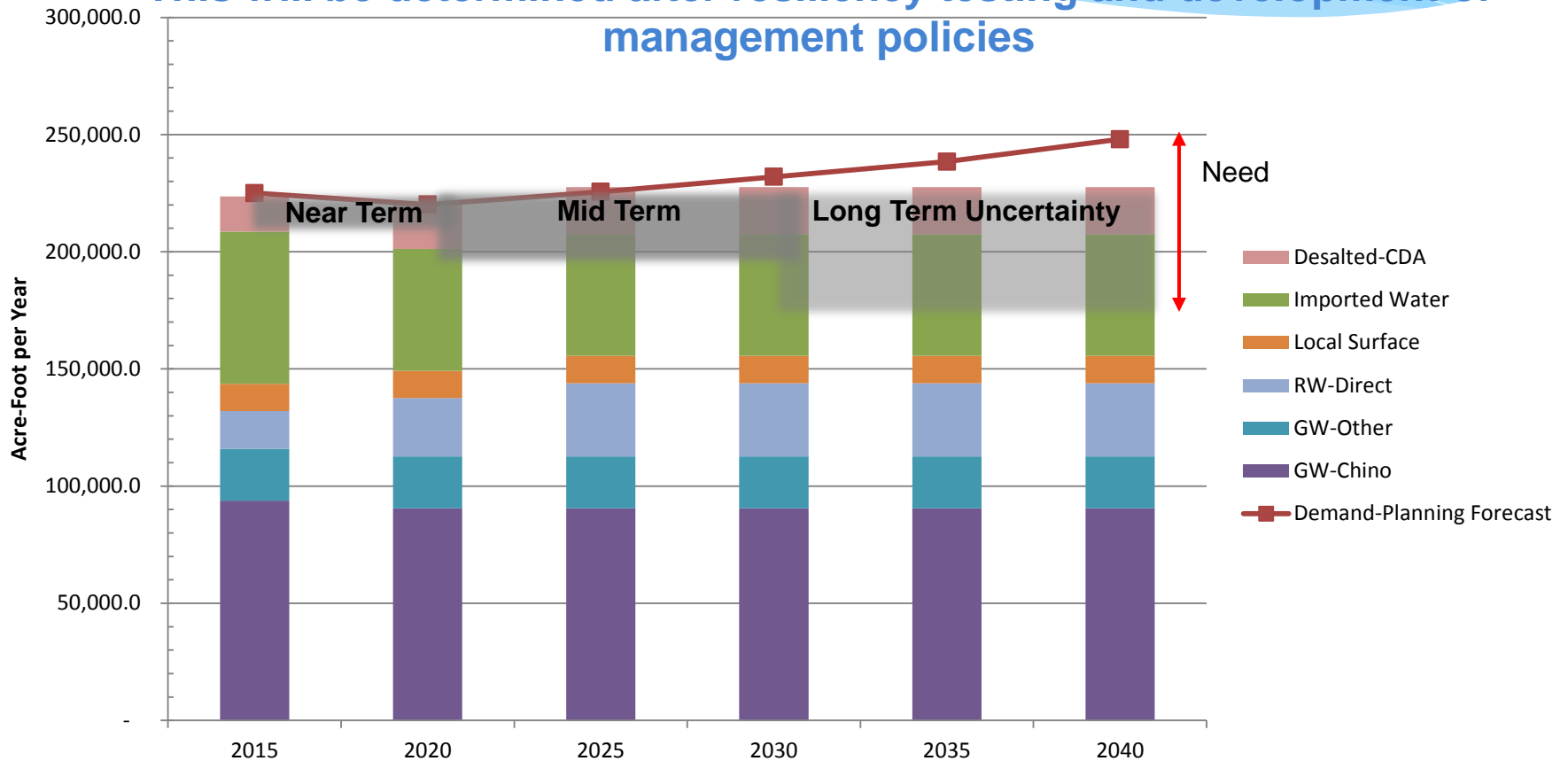
IRP Goals and Evaluation Criteria

Next Steps

1. Modify regional baseline demand forecast if needed based on today's feedback

2. Complete characterization of baseline water supplies

3. Draft IRP goals and criteria to develop and evaluate portfolios of water supply and management practices

4. Perform Chino Basin modeling (WEI)
   - Impacts from climate change, conservation and changes in development

5. Present outcomes for discussion at next June meeting

Thank You