Preliminary Gap Analysis of the 2020 Integrated Resources Plan

Integrated Resources Plan Special Committee

Item 6b

December 15, 2020

Overview

- Recent Activity
- Data Organization and Delivery
- Preliminary Assumptions and Gap Analysis
- Demand and Climate Change Experts
- Next Steps

Data Organization – General Categories

Retail Demand – By Agency

- Municipal & Industrial
- Agriculture
- Seawater Barrier
- Groundwater Replenishment

Local Supply – By Agency

- Surface Water
- Groundwater
- Groundwater Recovery
- Total Recycled Water
- Seawater Desalination
- Los Angeles Aqueduct

Conservation – By Agency

- Active and Code Based

Demographics – By Agency

- Population
- Households
- Employment

Imported Supply

- State Water Project
- Colorado River

Climate – By Agency

- Weather Effect Factors
- Precipitation

Demands on MWD

- Consumptive Use
- Seawater Barrier
- Replenishment

- Historical
- Projections for each Scenario

Data Organization – General Categories

Retail Demand – By Agency

- **Municipal & Industrial**
- **Agriculture**
- **Seawater Barrier**
- **Groundwater Replenishment**

Trial	Hydrology	2020	2021	2022	2023	20
1	1922	353,526	364,019	366,149	364,320	35
2	1923	363,784	365,913	364,086	359,154	35
3	1924	365,678	363,852	358,923	356,441	36
4	1925	363,617	358,692	356,212	367,735	36
5	1926	358,461	355,983	367,498	367,658	36
6	1927	355,754	367,262	367,421	363,953	36
7	1928	367,025	367,185	363,719	368,871	36
8	1929	366,948	363,485	368,633	361,788	36
9	1930	363,251	368,396	361,556	362,952	36
10	1931	368,159	361,323	362,718	368,414	35
11	1932	361,090	362,485	368,178	359,422	36
12	1933	362,252	367,941	359,190	368,576	35
13	1934	367,704	358,959	368,338	359,016	35
14	1935	358,728	368,101	358,785	358,266	36
15	1936	367,864	358,554	358,035	364,146	36
16	1937	358,323	357,805	363,912	367,131	34
17	1938	357,574	363,678	366,895	346,452	36
18	1939	363,444	366,659	346,229	366,912	36
19	1940	366,423	346,006	366,676	365,072	35
20	1941	345,783	366,440	364,838	355,146	36

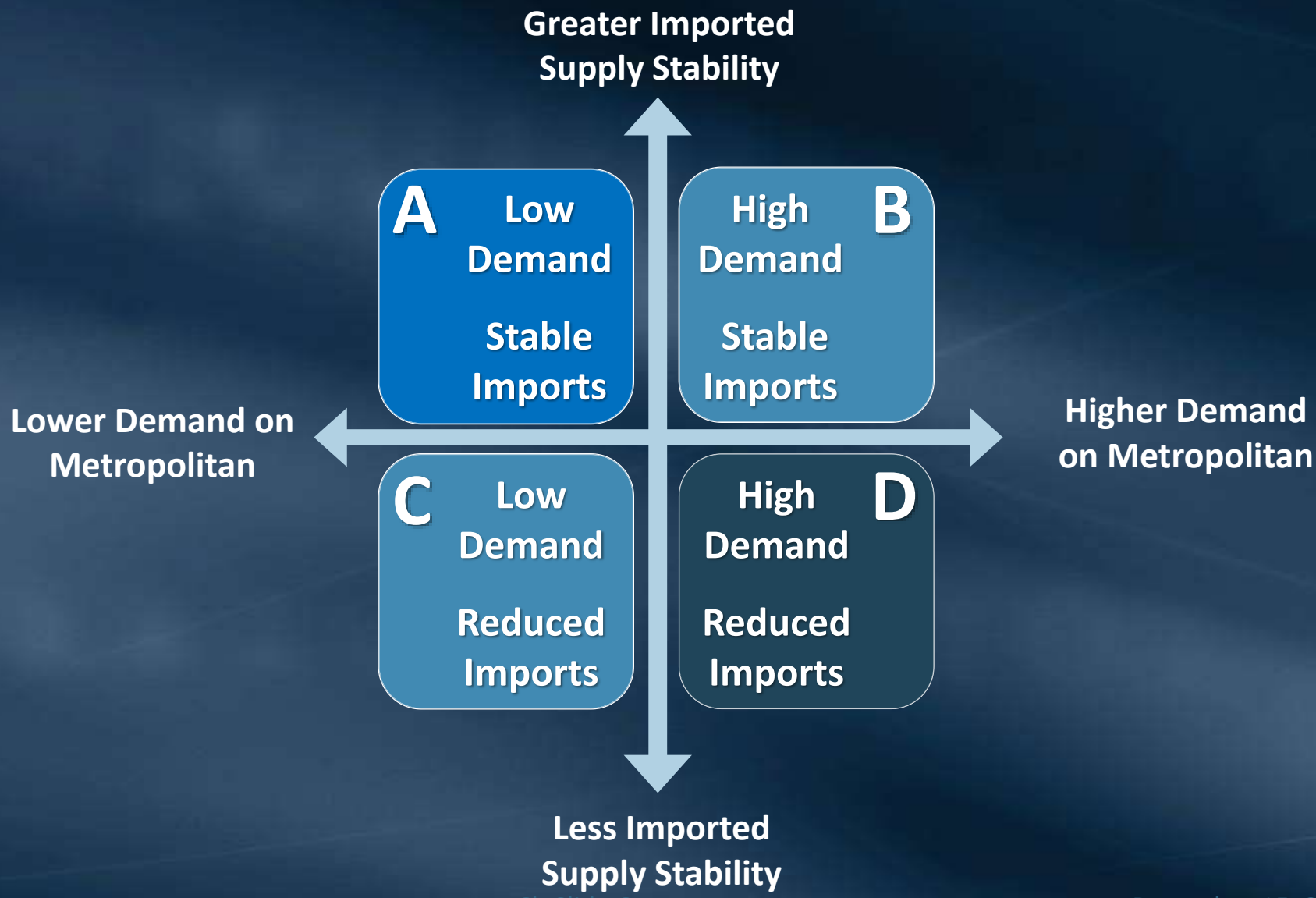
25 (Forecast years)

96 (Hydrologic years)

Recent Activities

- Oct 16 – Member Agency Managers Meeting
  - Assumptions and Initial results for Scenarios A and D
- Oct 27 – IRP Special Committee Meeting
  - Assumptions and Initial results for Scenarios A and D
- Nov 13 – Member Agency Managers Meeting
  - Assumptions and Initial results for Scenarios B and C
- Nov 24 – Member Agency Technical Workgroup
  - Preliminary Gap Analysis for all Scenarios

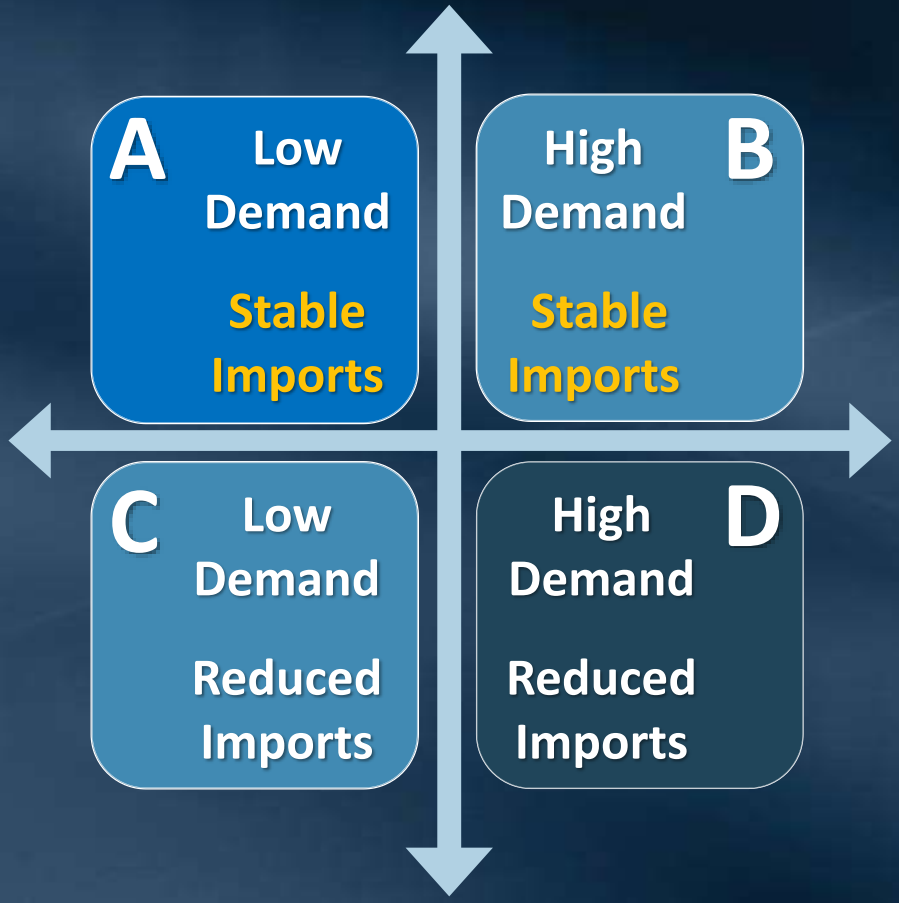
Framing the Scenarios



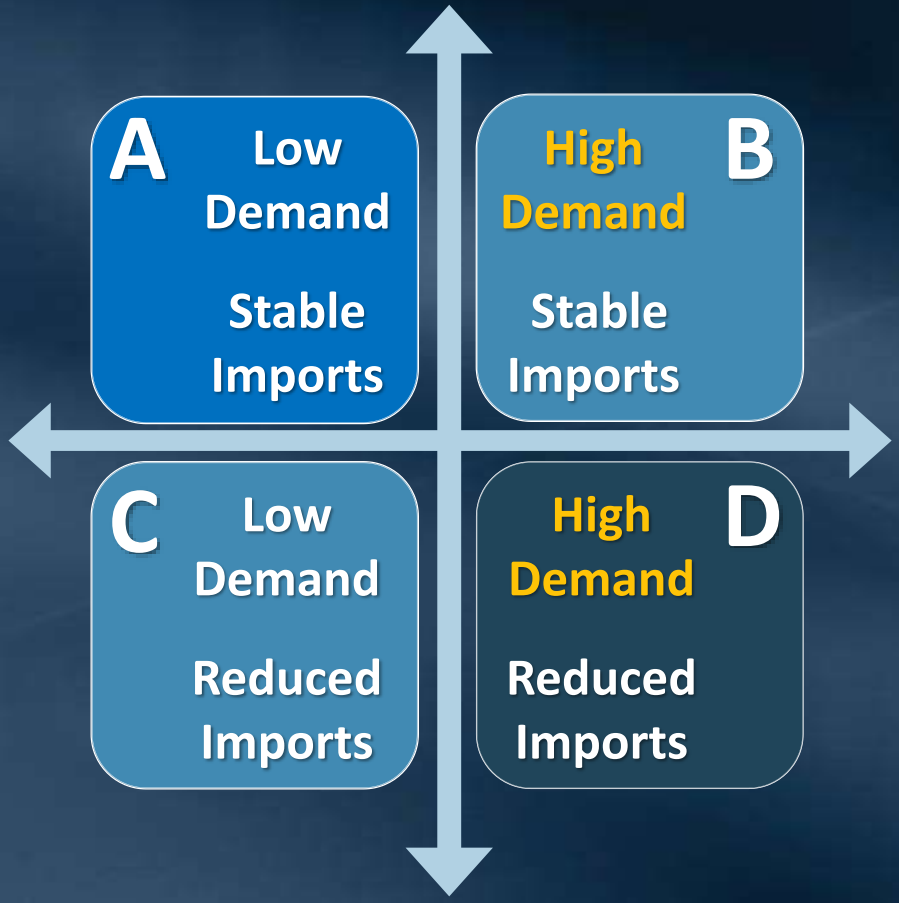
Driving the Scenarios

A - B

Gradual Climate Impacts & Low Regulatory Impacts



Driving the Scenarios



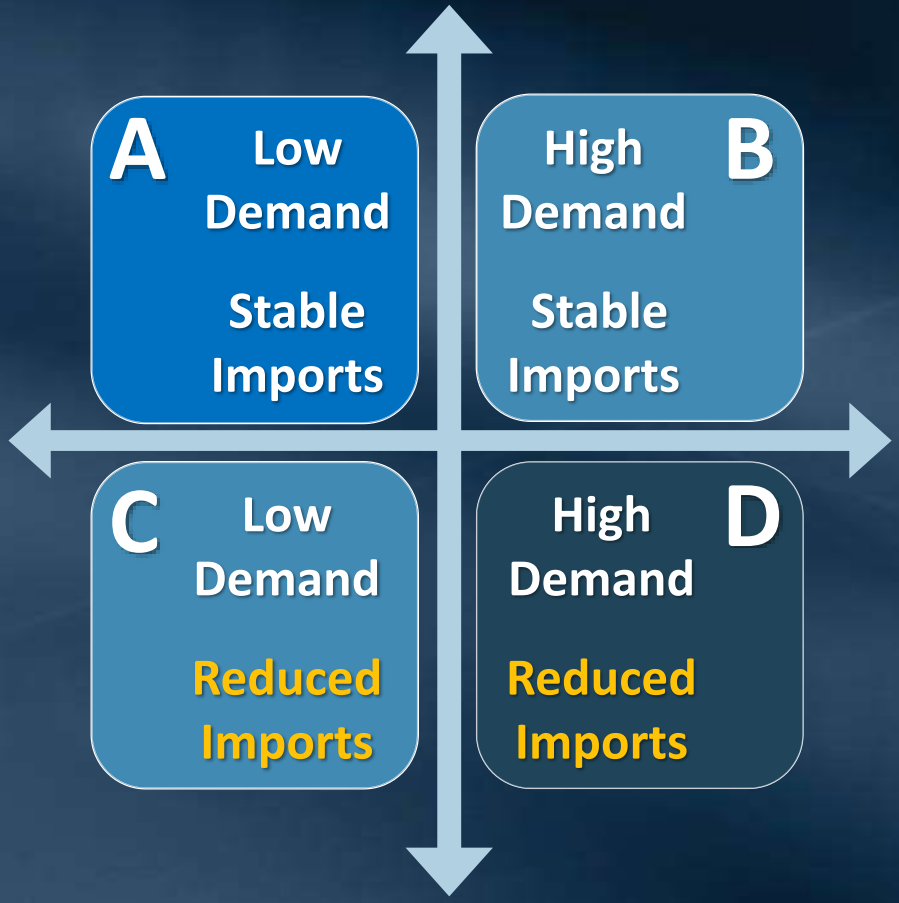
A - B

Gradual Climate Impacts & Low Regulatory Impacts

B - D

High Economic Growth

Driving the Scenarios



A - B

Gradual Climate Impacts & Low Regulatory Impacts

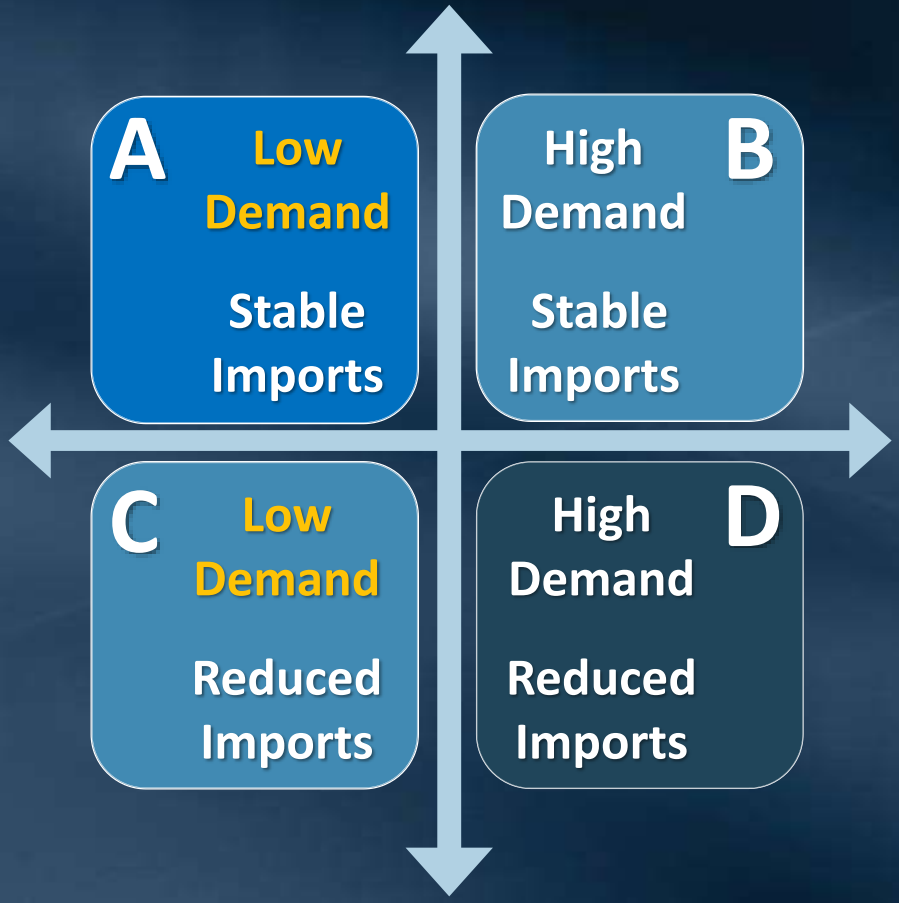
B - D

High Economic Growth

C - D

Severe Climate Impacts and high Regulatory Impacts

Driving the Scenarios



A - B

Gradual Climate Impacts & Low Regulatory Impacts

B - D

High Economic Growth

C - D

Severe Climate Impacts & High Regulatory Impacts

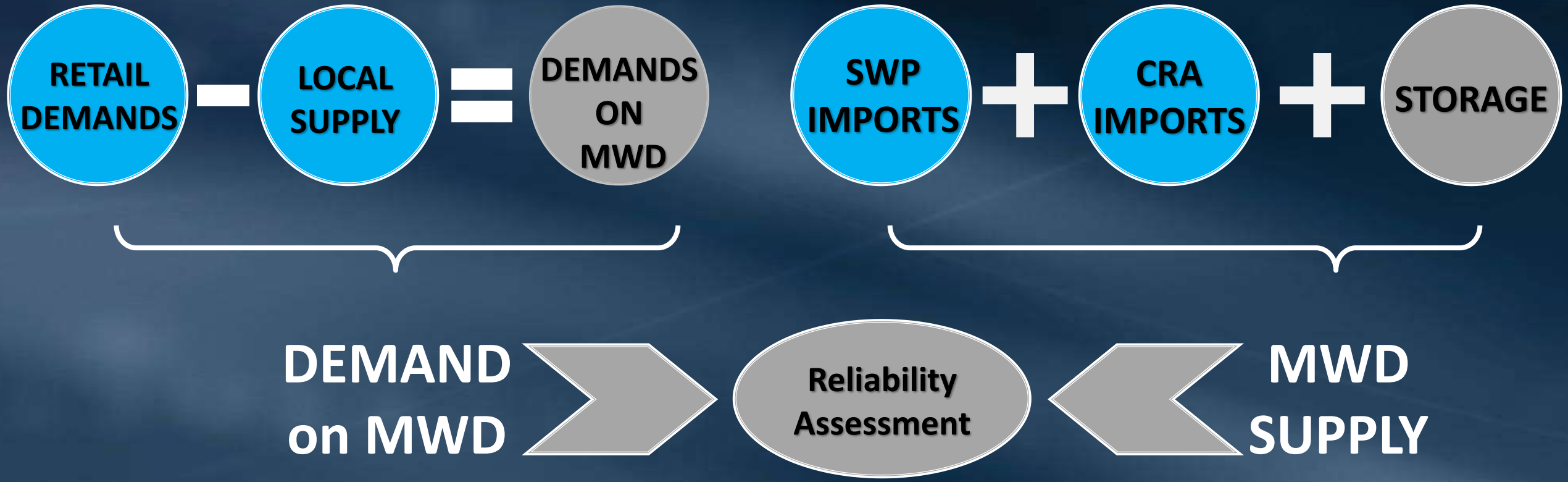
A - C

Slow Economic Growth

Preliminary Analysis

Piecing Together the Reliability Assessment

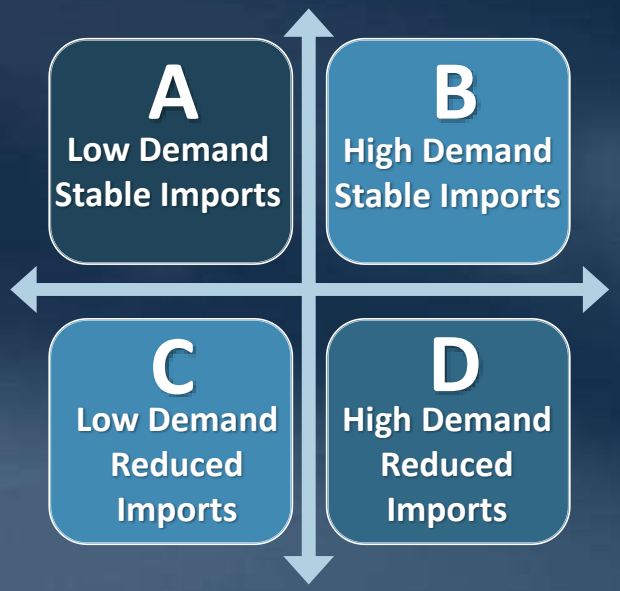
"Gap Analysis"

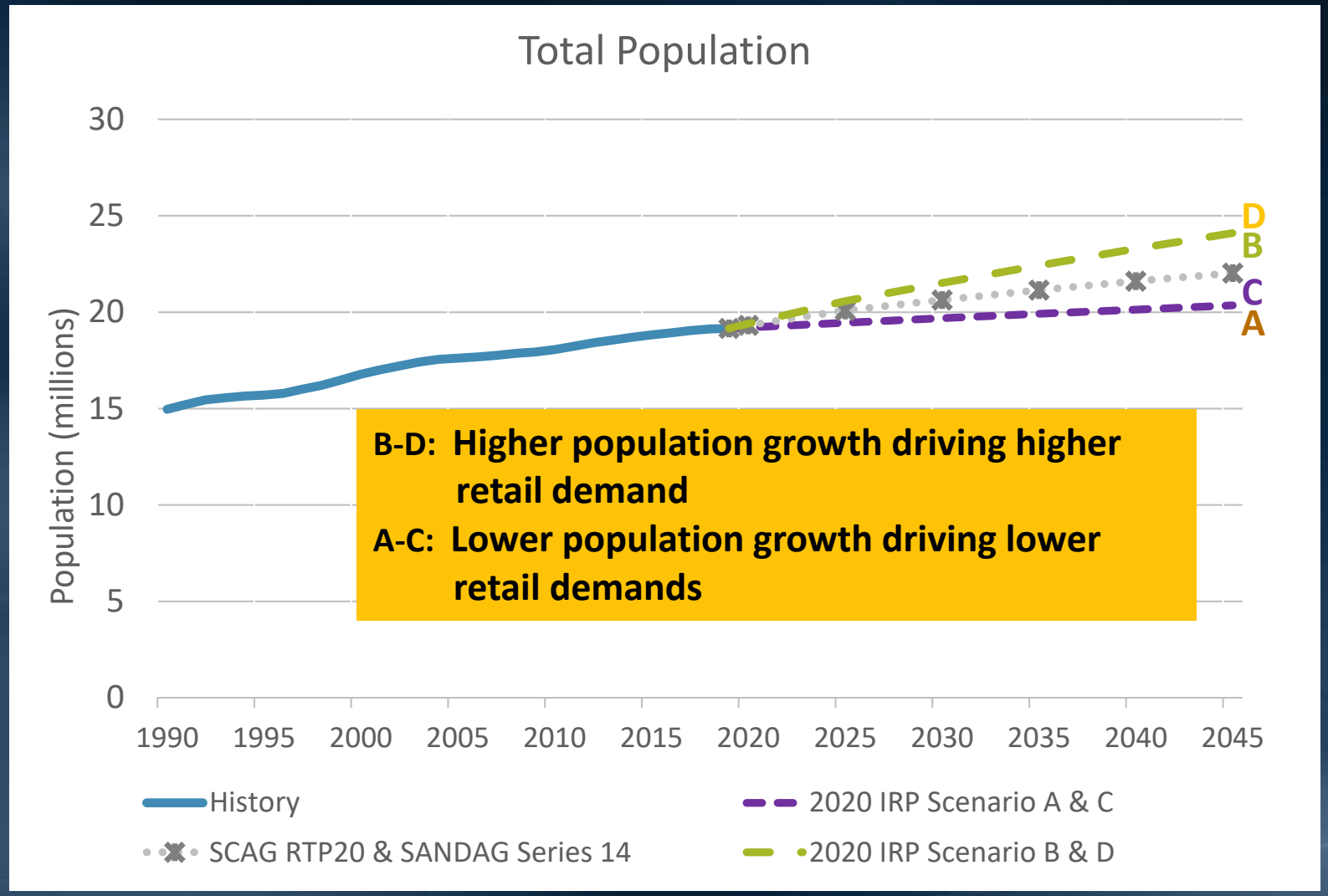


Assumption driven

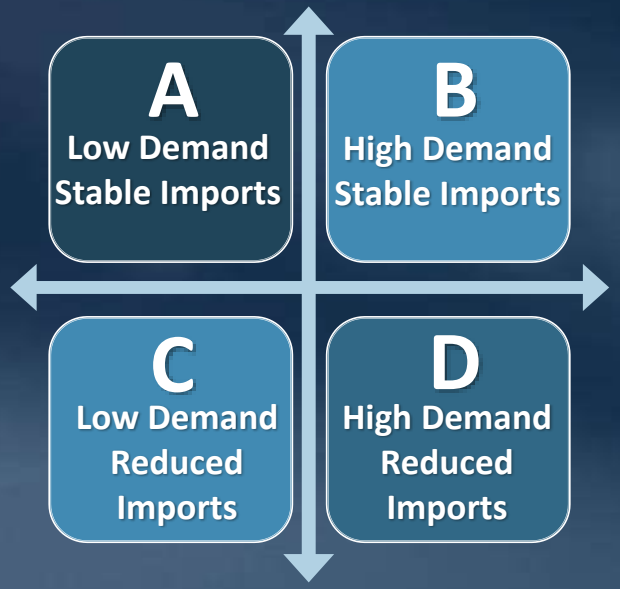
Calculated or modeled based on assumptions

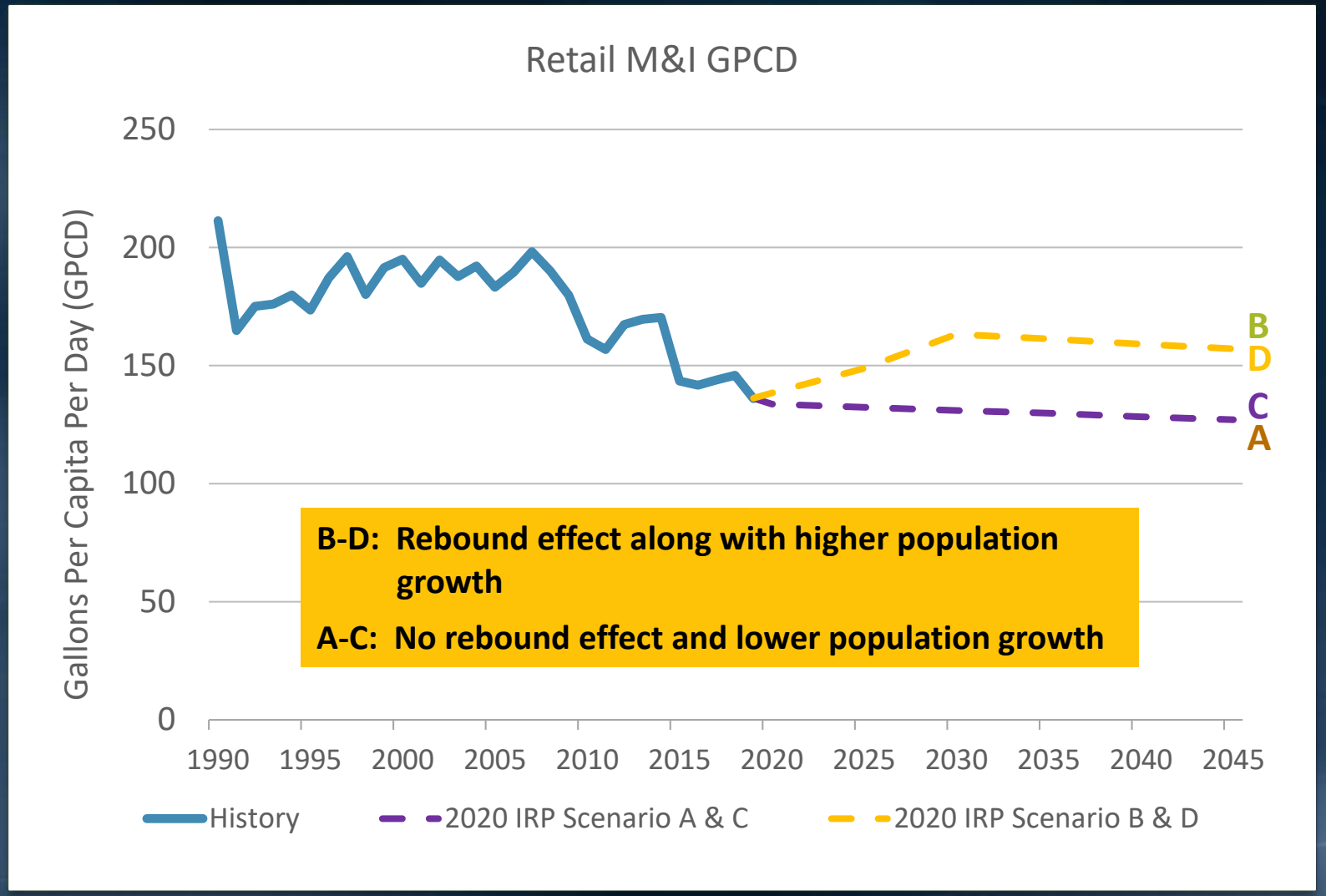
Preliminary Total Population



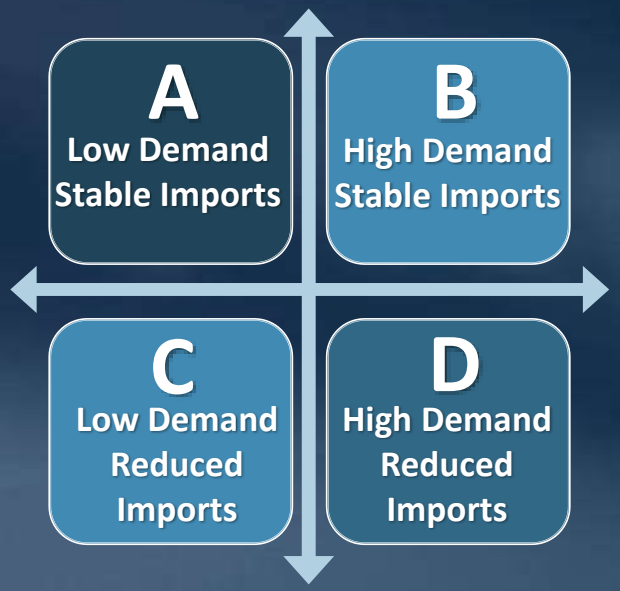


Preliminary M&I GPCD



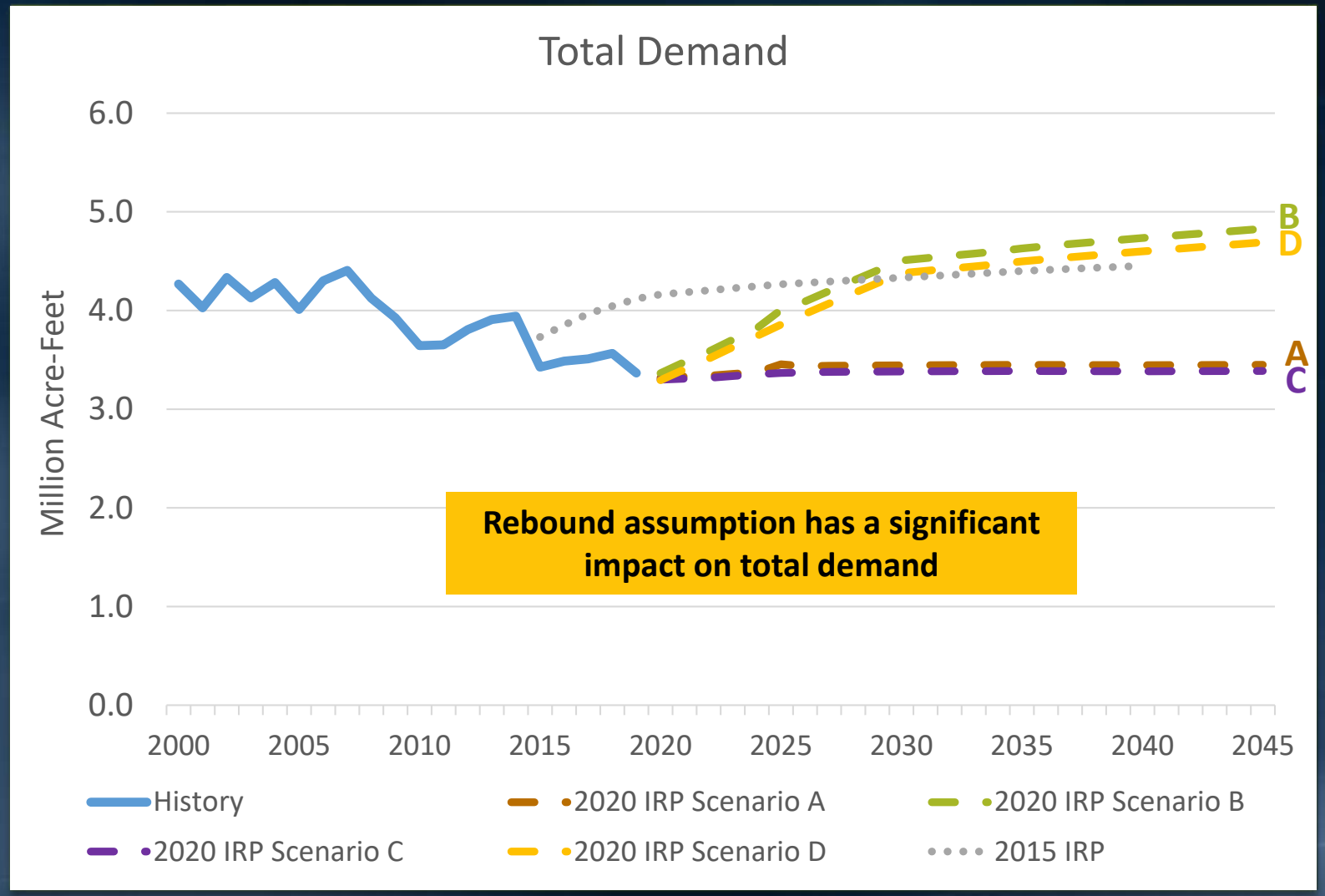


Preliminary Total Demands

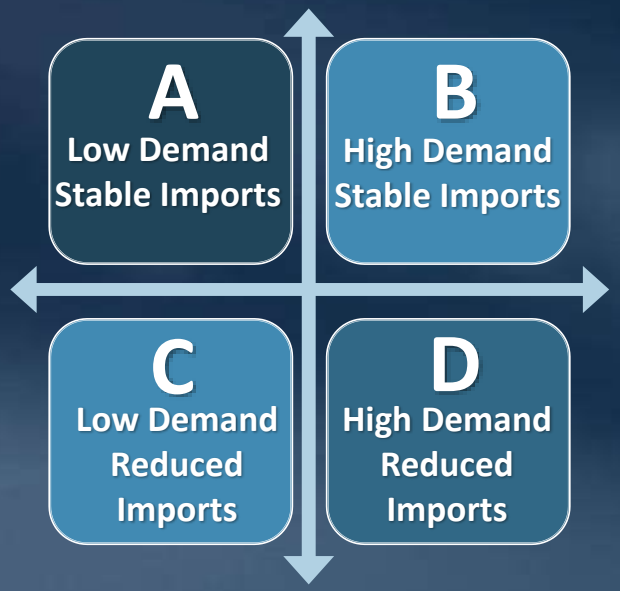


Total Demand

- Retail M&I Demand
- Agricultural Demand
- Seawater Barrier Demand
- GW Replenishment Demand



Preliminary Retail M&I Demand



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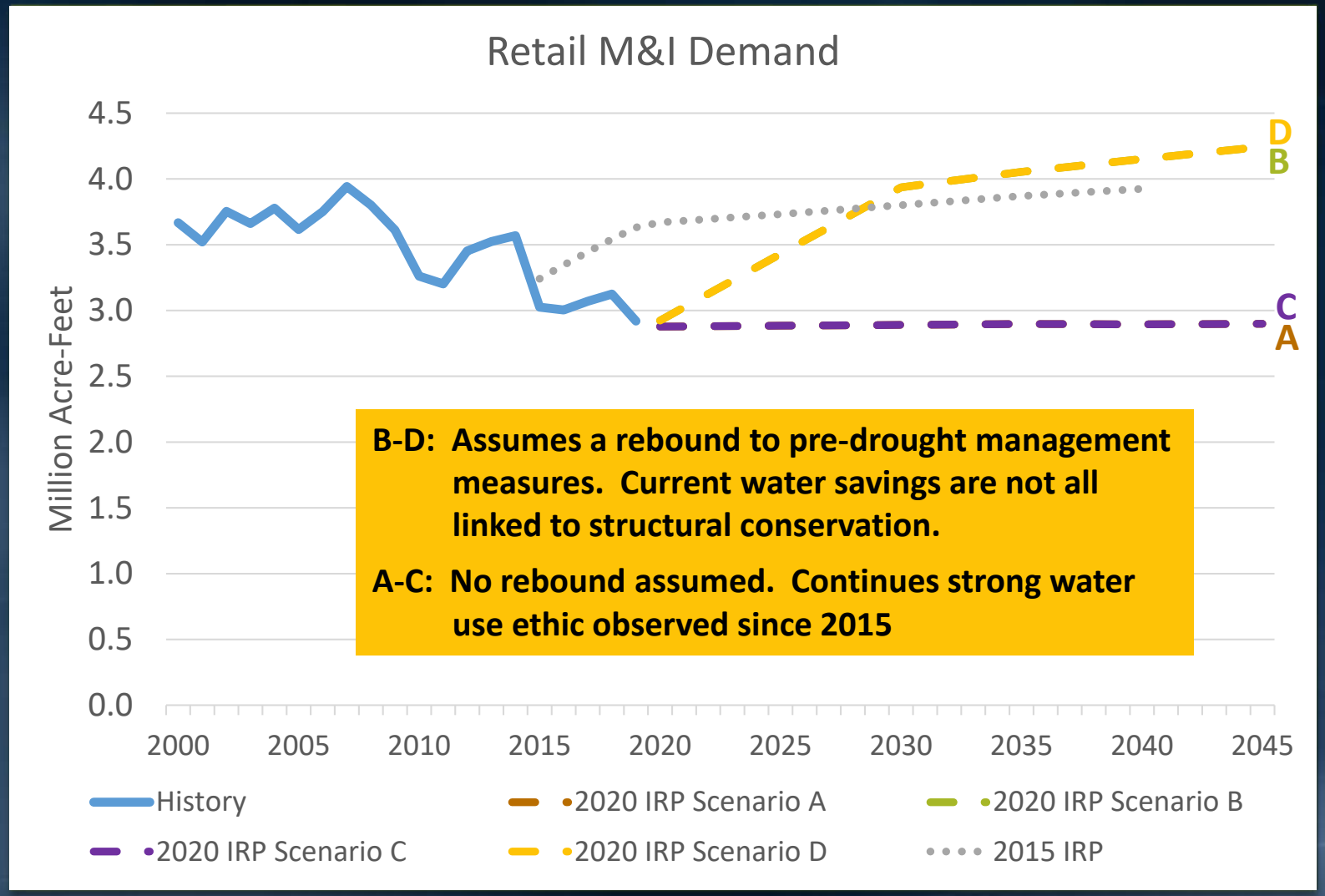
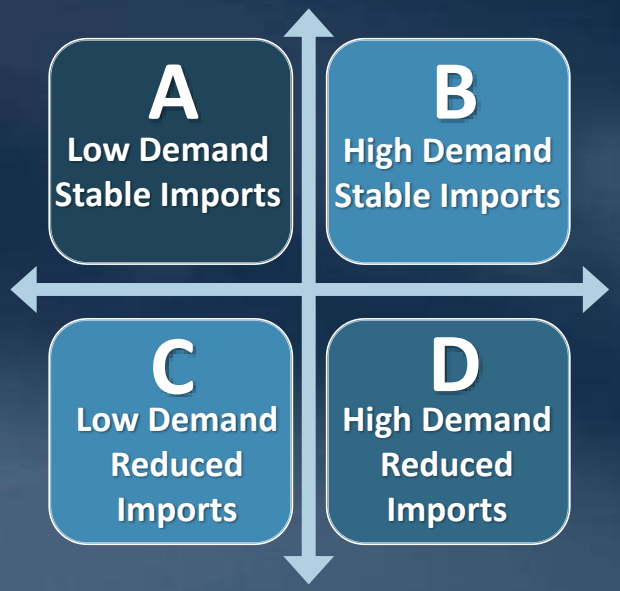
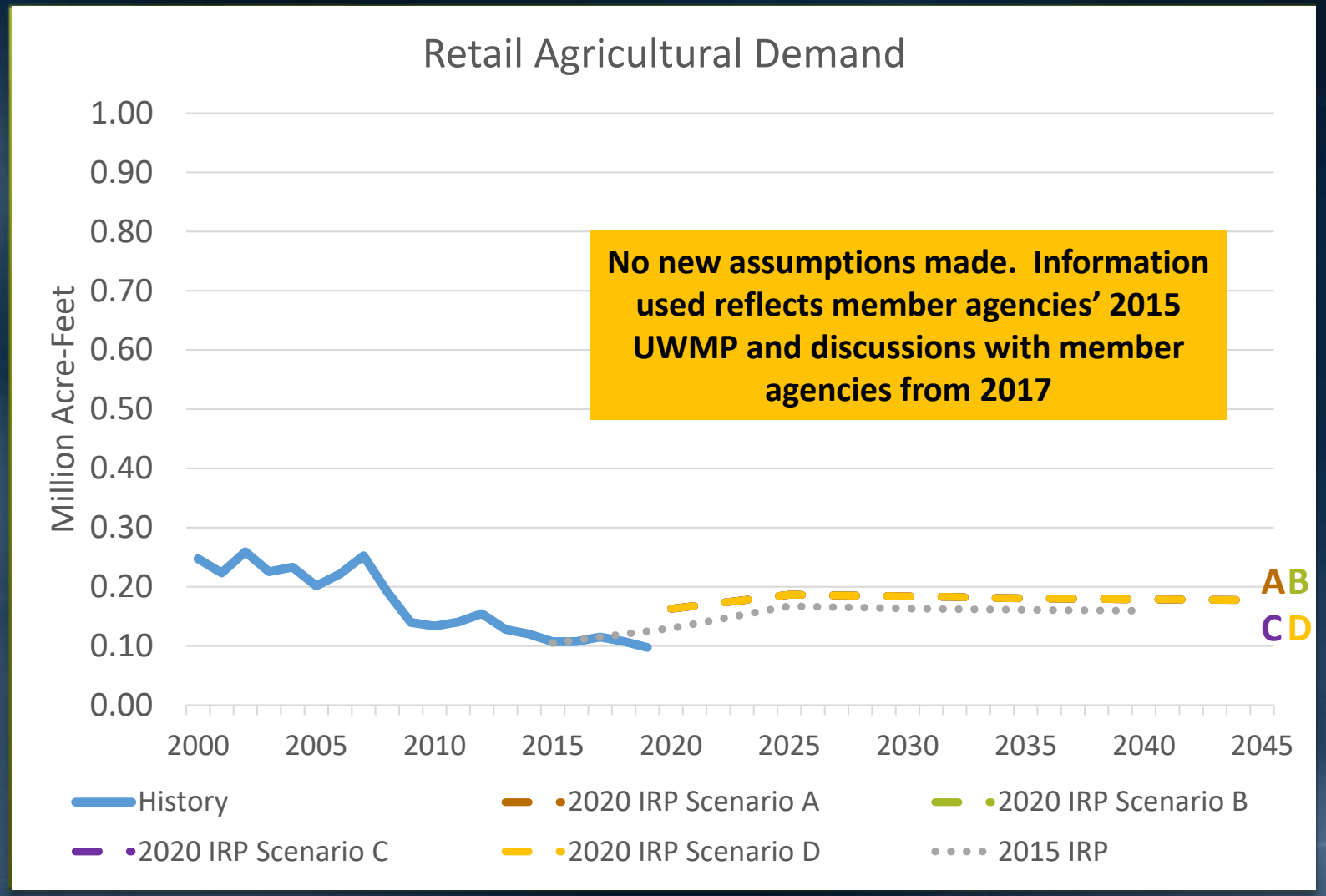


Preliminary Agricultural Demand

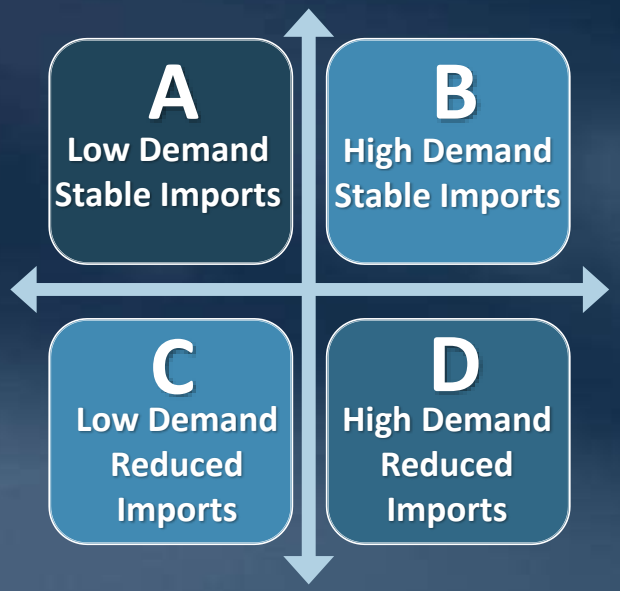


Total Demand

- Retail M&I Demand
- **Agricultural Demand**
- Seawater Barrier Demand
- GW Replenishment Demand



Preliminary Seawater Barrier Demand



Total Demand

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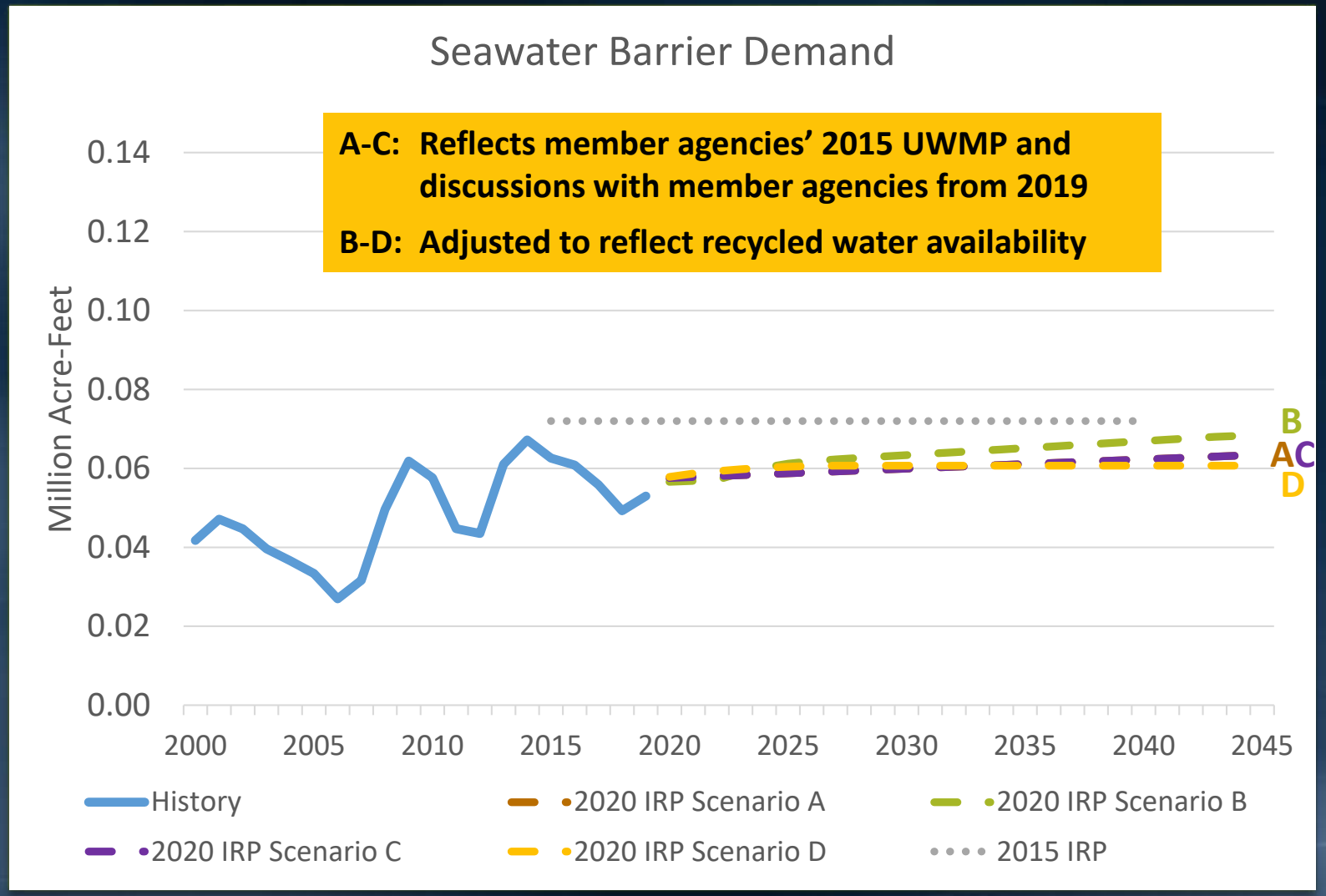
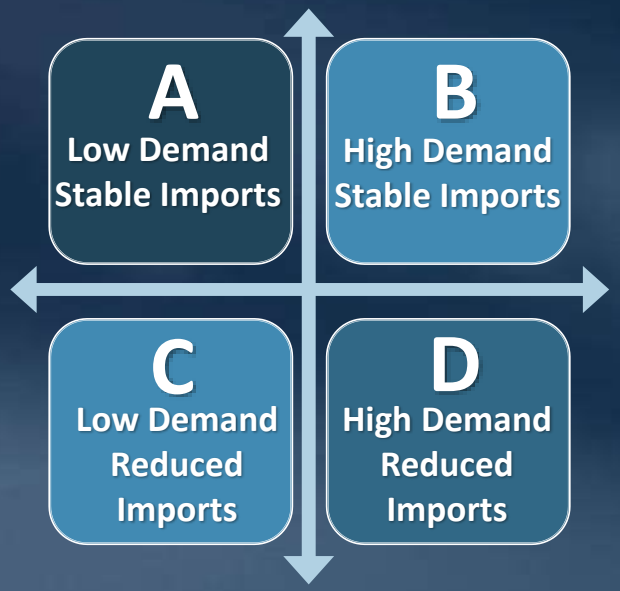
- Agricultural Demand
- **Seawater Barrier Demand**
- GW Replenishment Demand



Preliminary Groundwater Replenishment Demand



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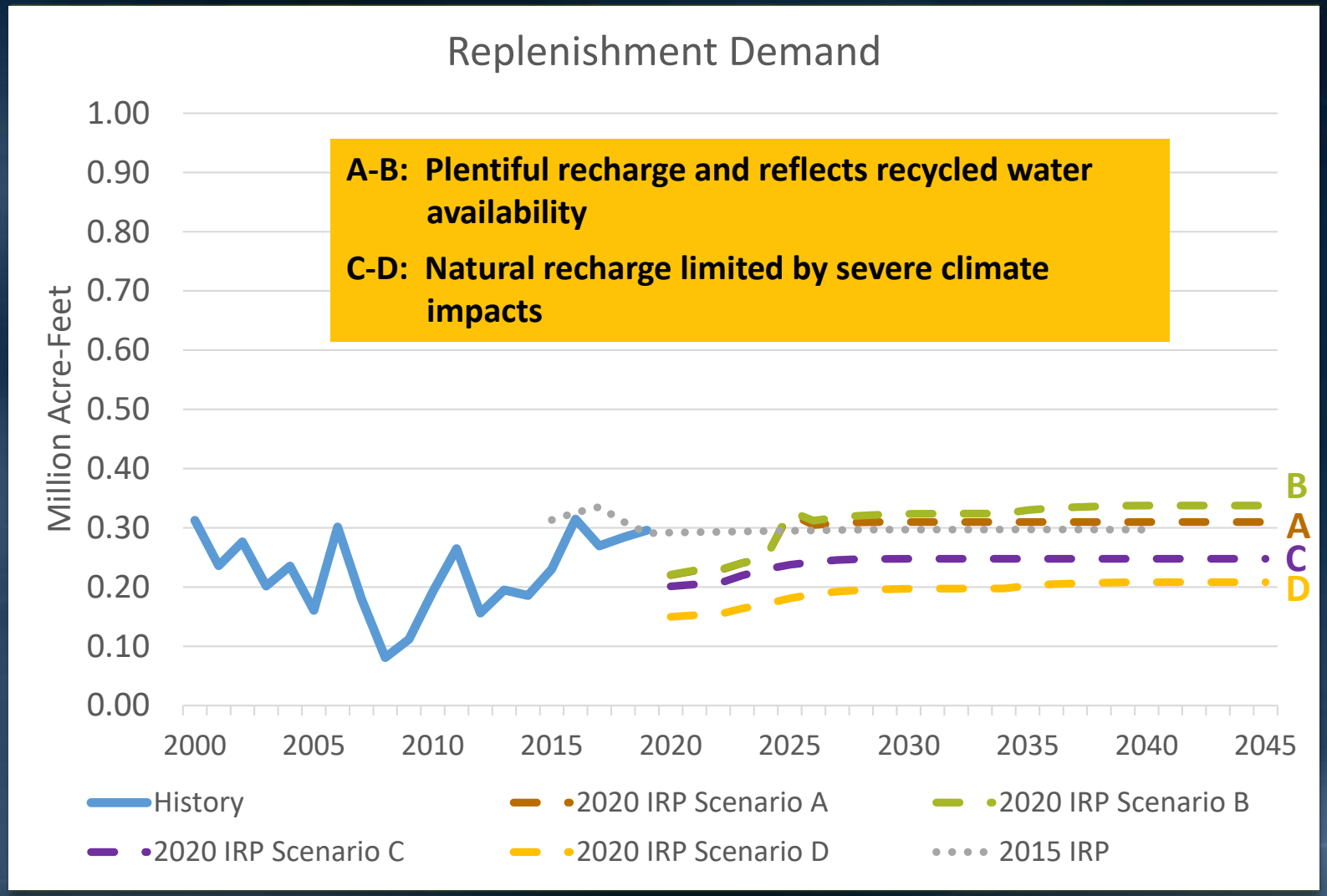
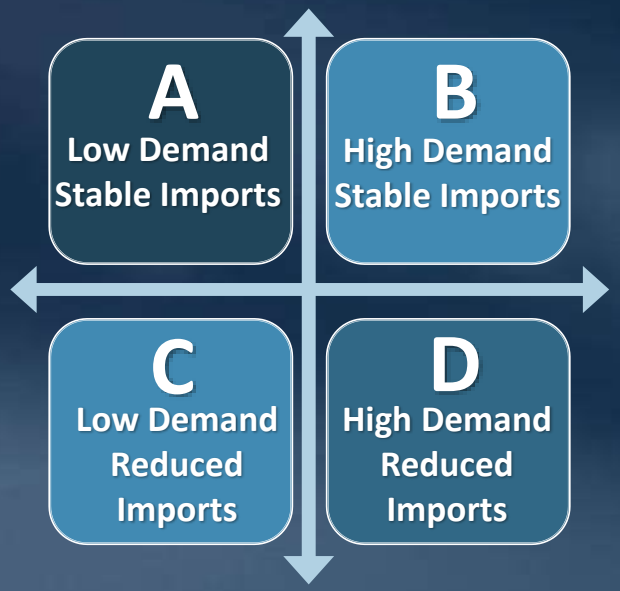


Feedback and Further Examination Underway

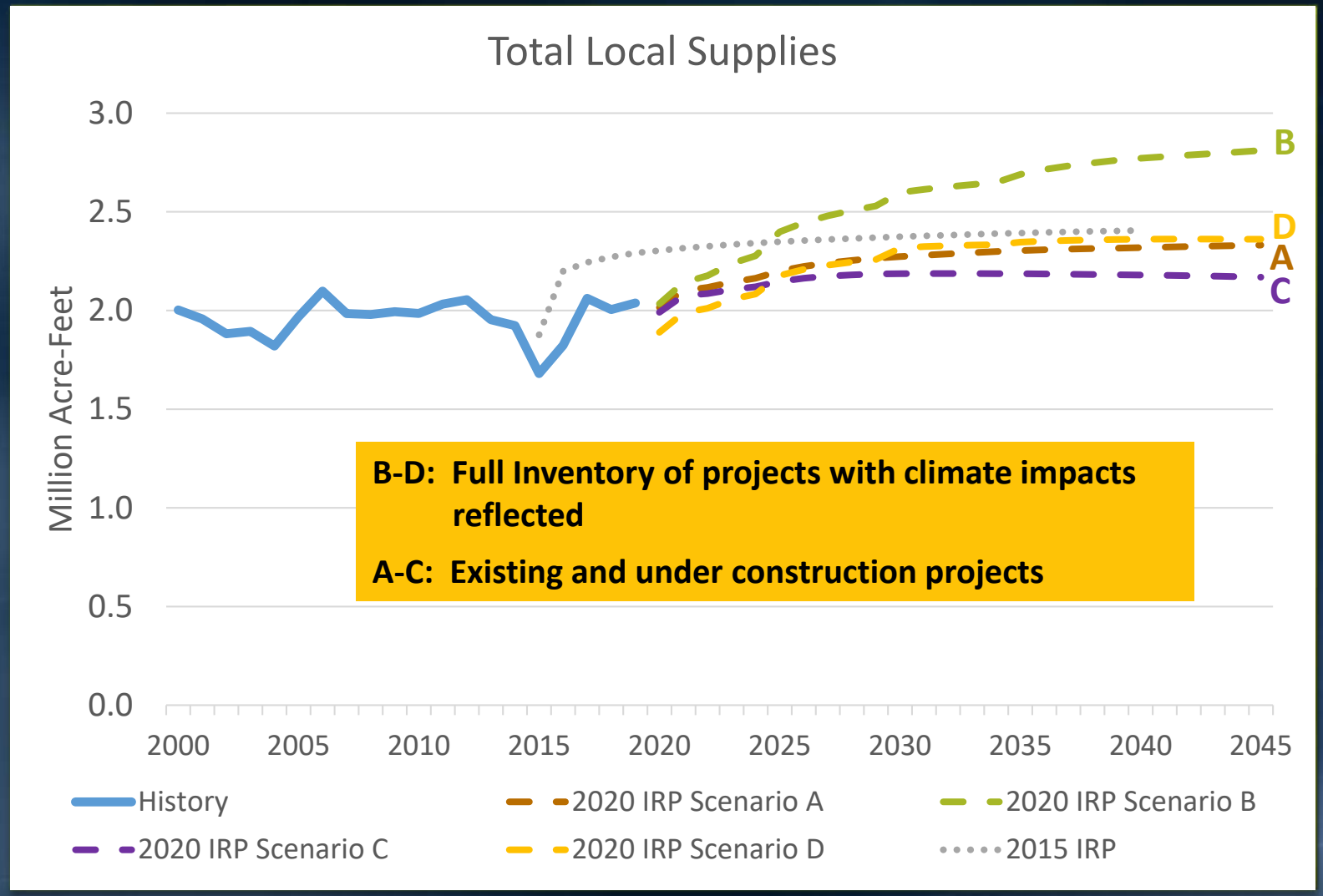
- Investigate drivers for continued low demands in order to inform demand rebound assumptions
- Plausible higher/lower population, demographic and economic growth
- Agricultural demand patterns
- Update seawater barrier demands and operating assumptions

Preliminary Total Local Supply Production

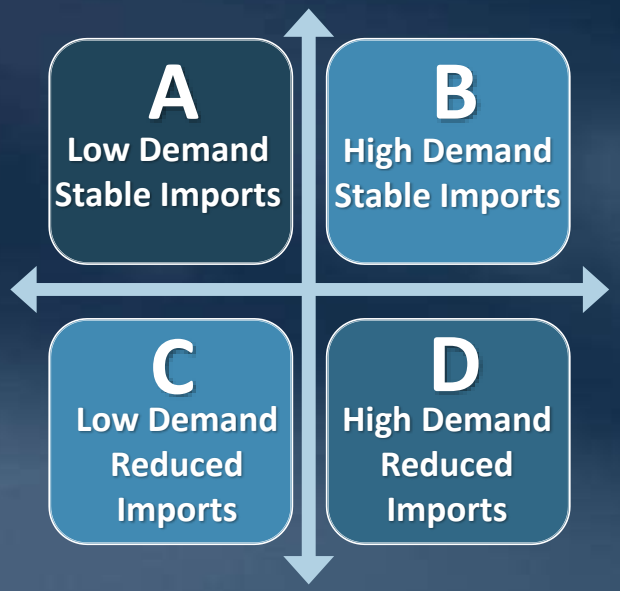


Total Local Supply Production

- Groundwater
- Groundwater Recovery
- Total Recycled Water
- Seawater Desalination
- Surface Water
- Los Angeles Aqueduct



Preliminary Groundwater



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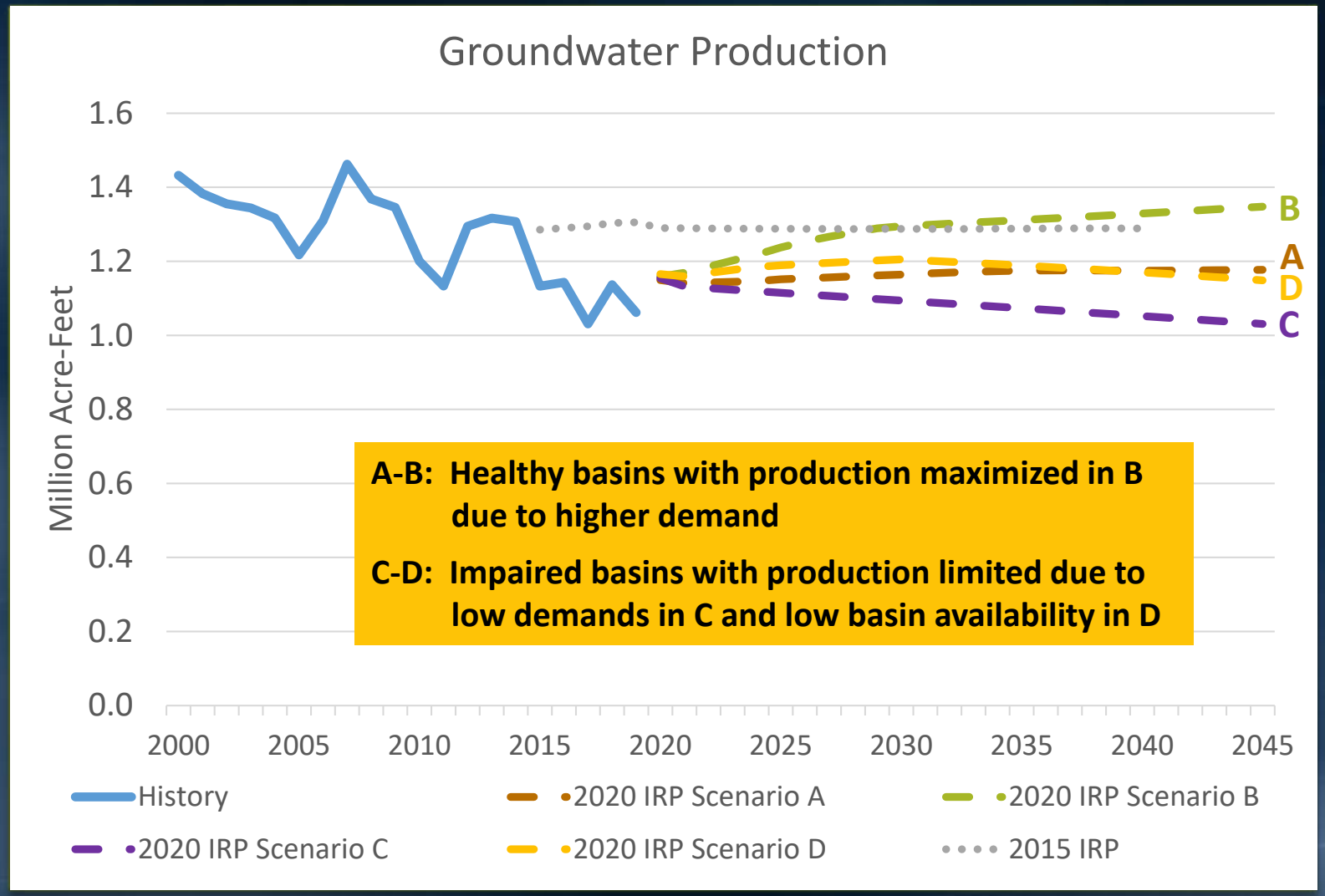
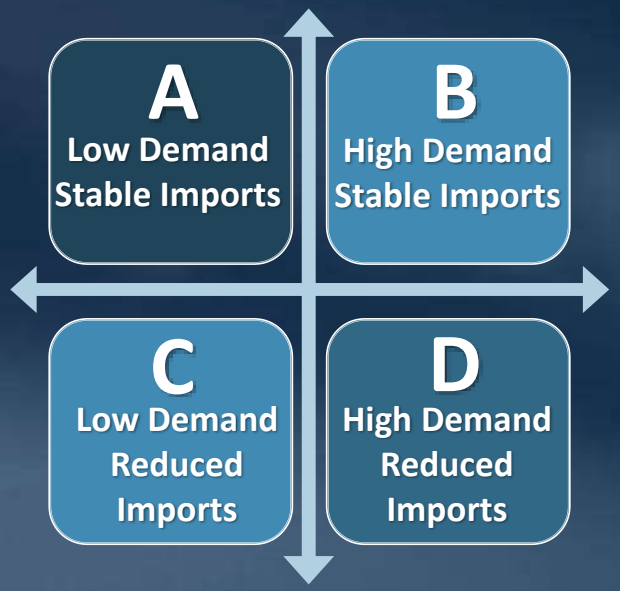


Preliminary Groundwater Recovery



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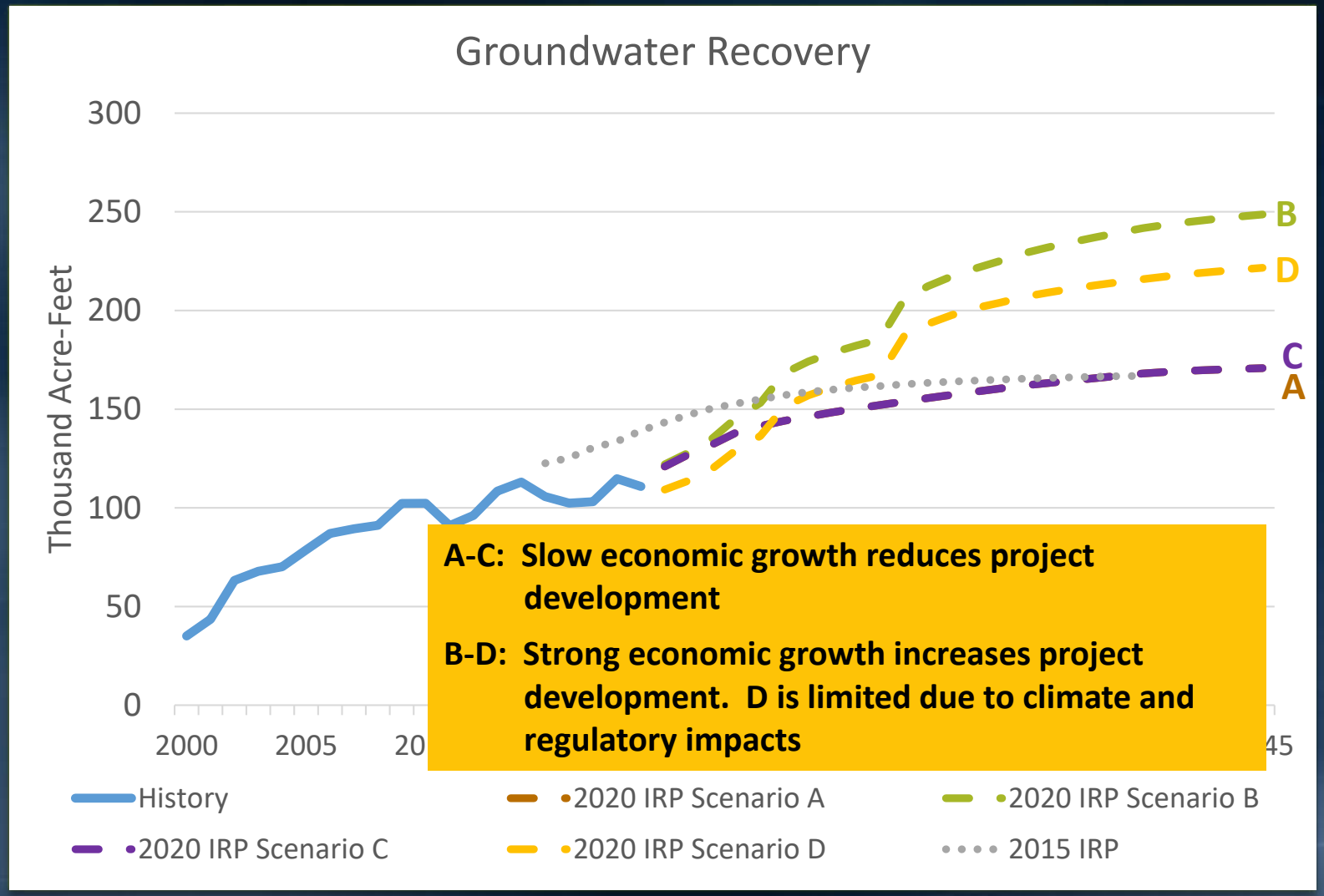
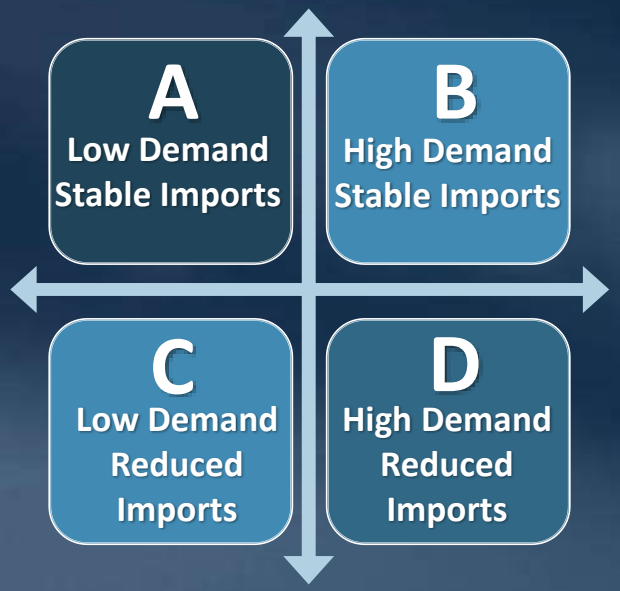


Preliminary Recycled Water



Total Local Supply Production

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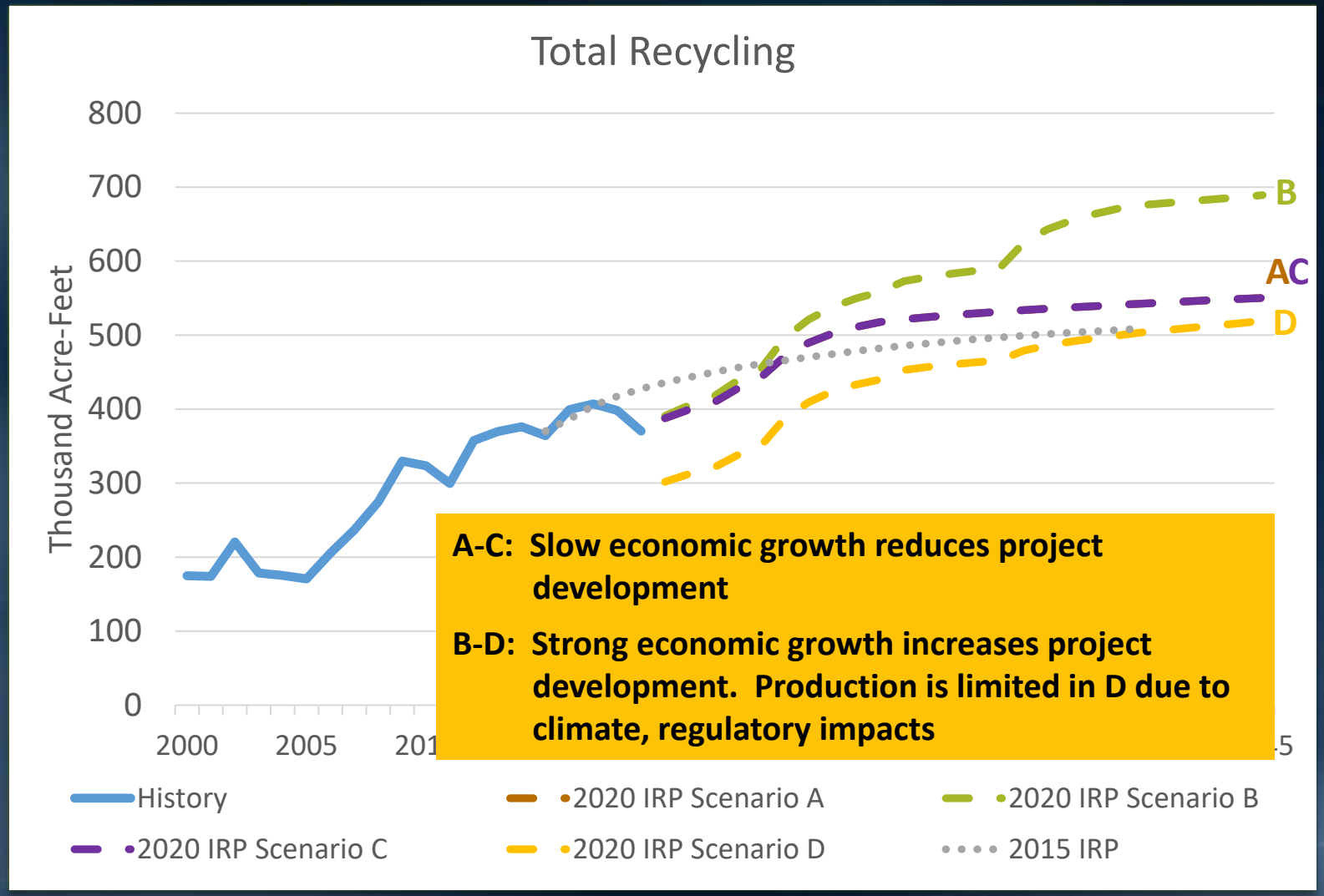
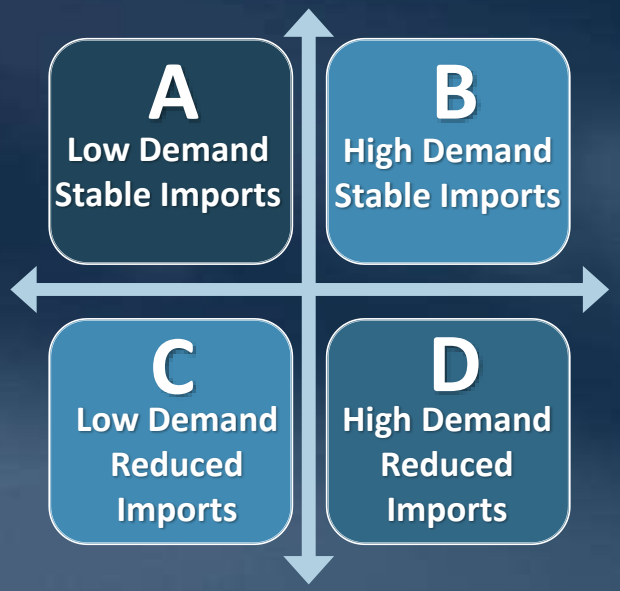


Preliminary Seawater Desalination



Total Local Supply Production

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- **Seawater Desalination**
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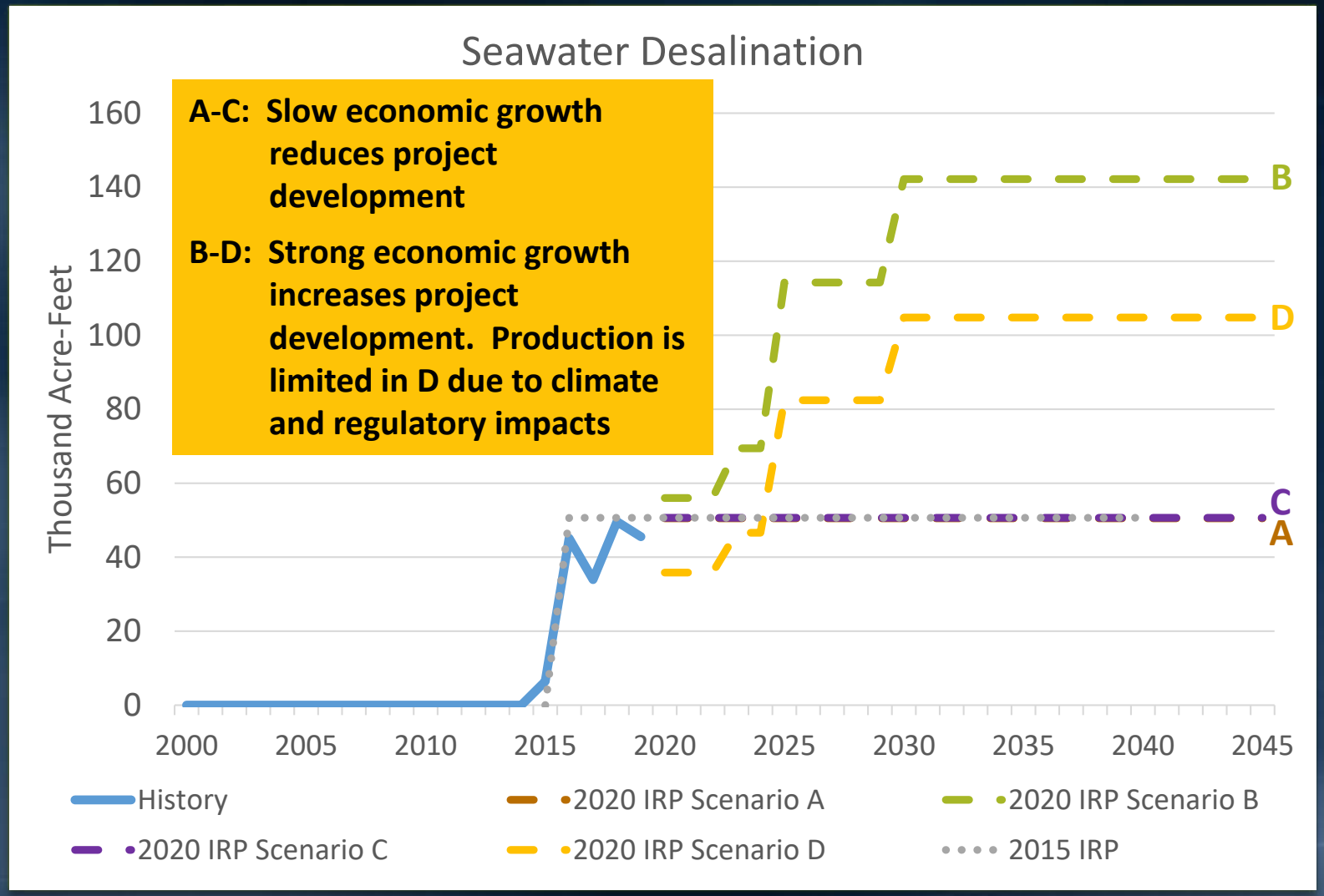
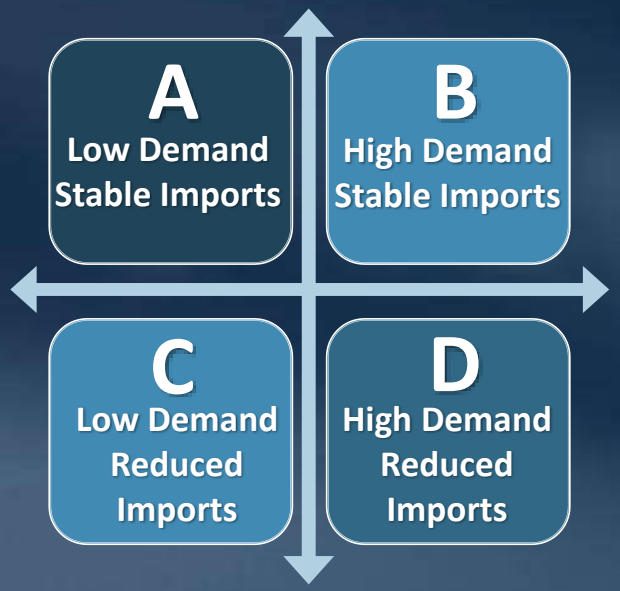


Preliminary Surface Water



Total Local Supply Production

- Groundwater
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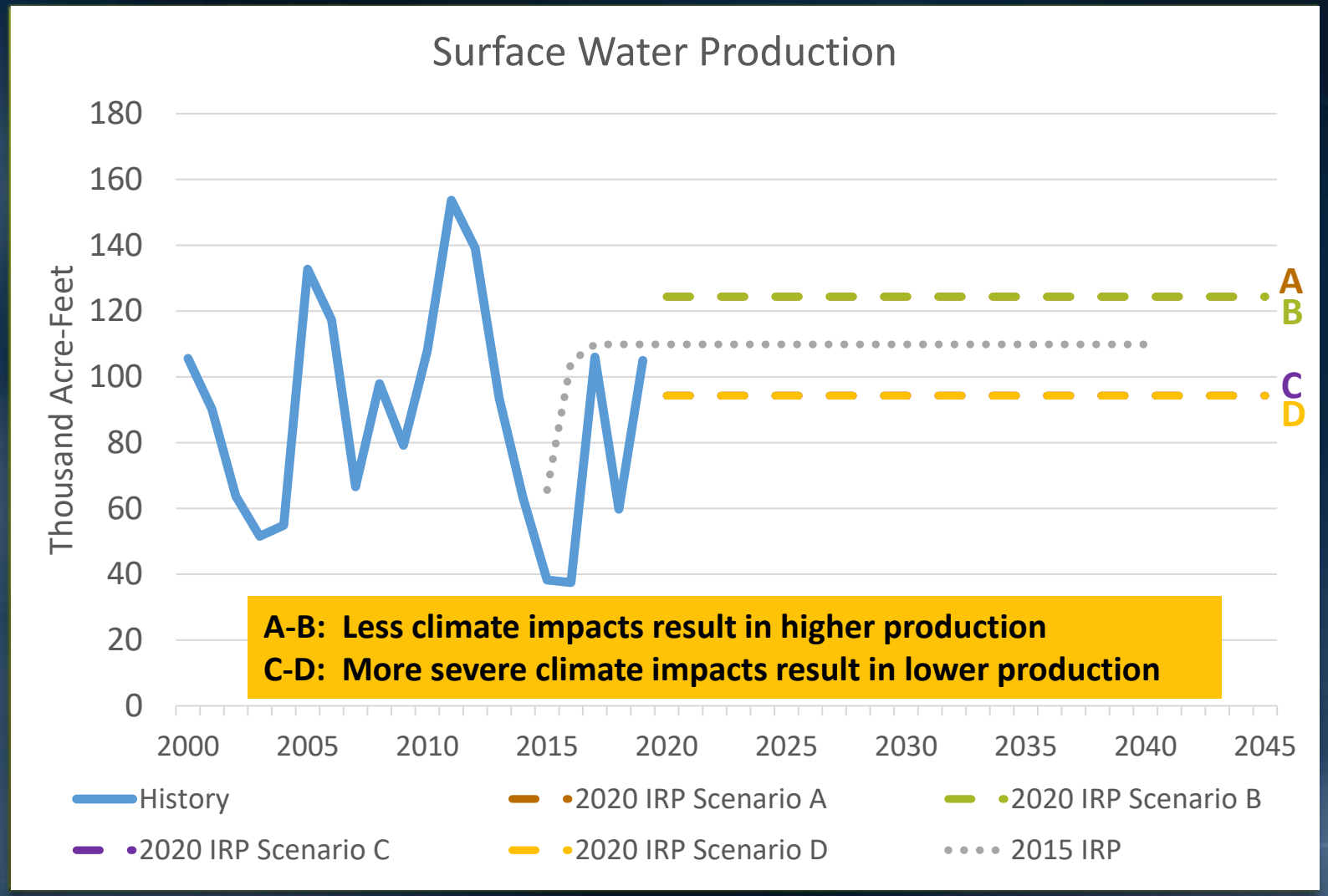
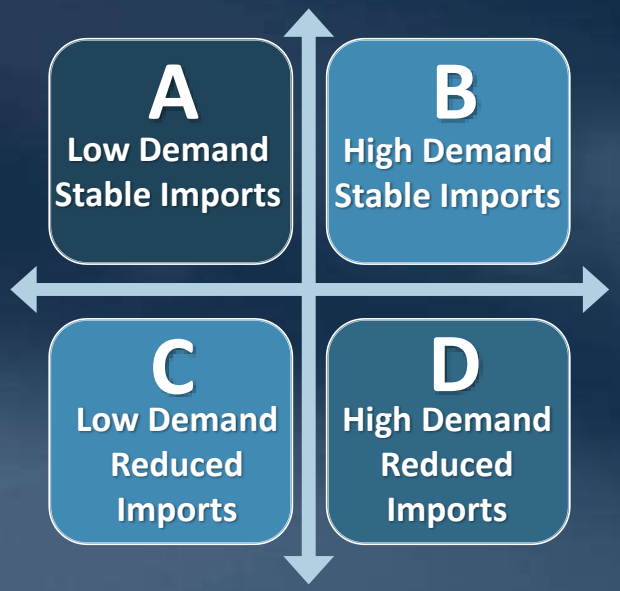
- Total Recycled Water
- Seawater Desalination
- **Surface Water**
- Los Angeles Aqueduct



Preliminary Los Angeles Aqueduct



Total Local Supply Production

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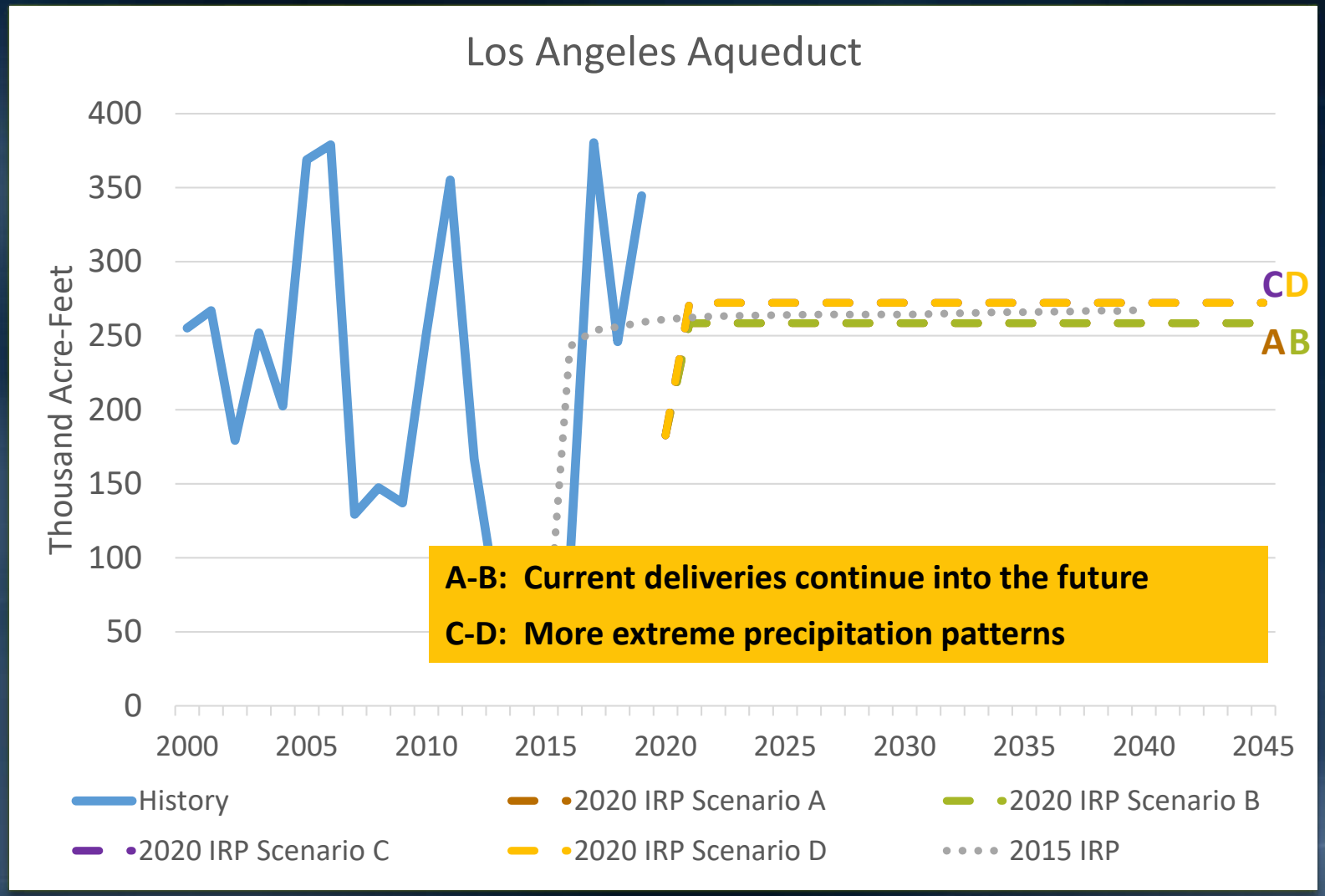
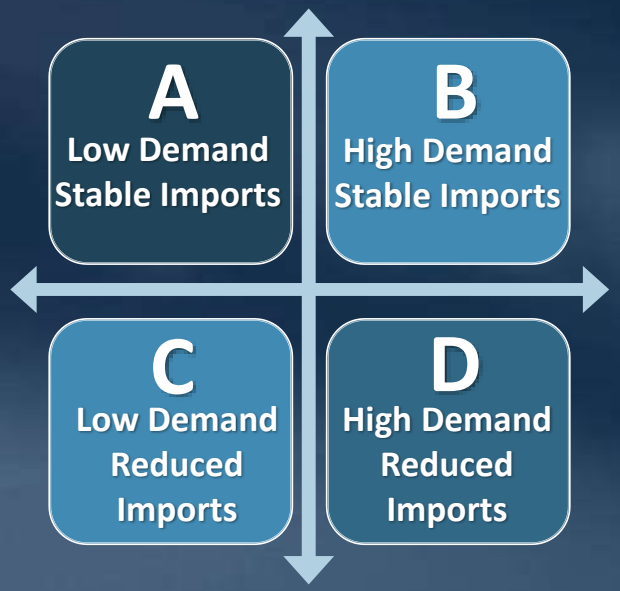
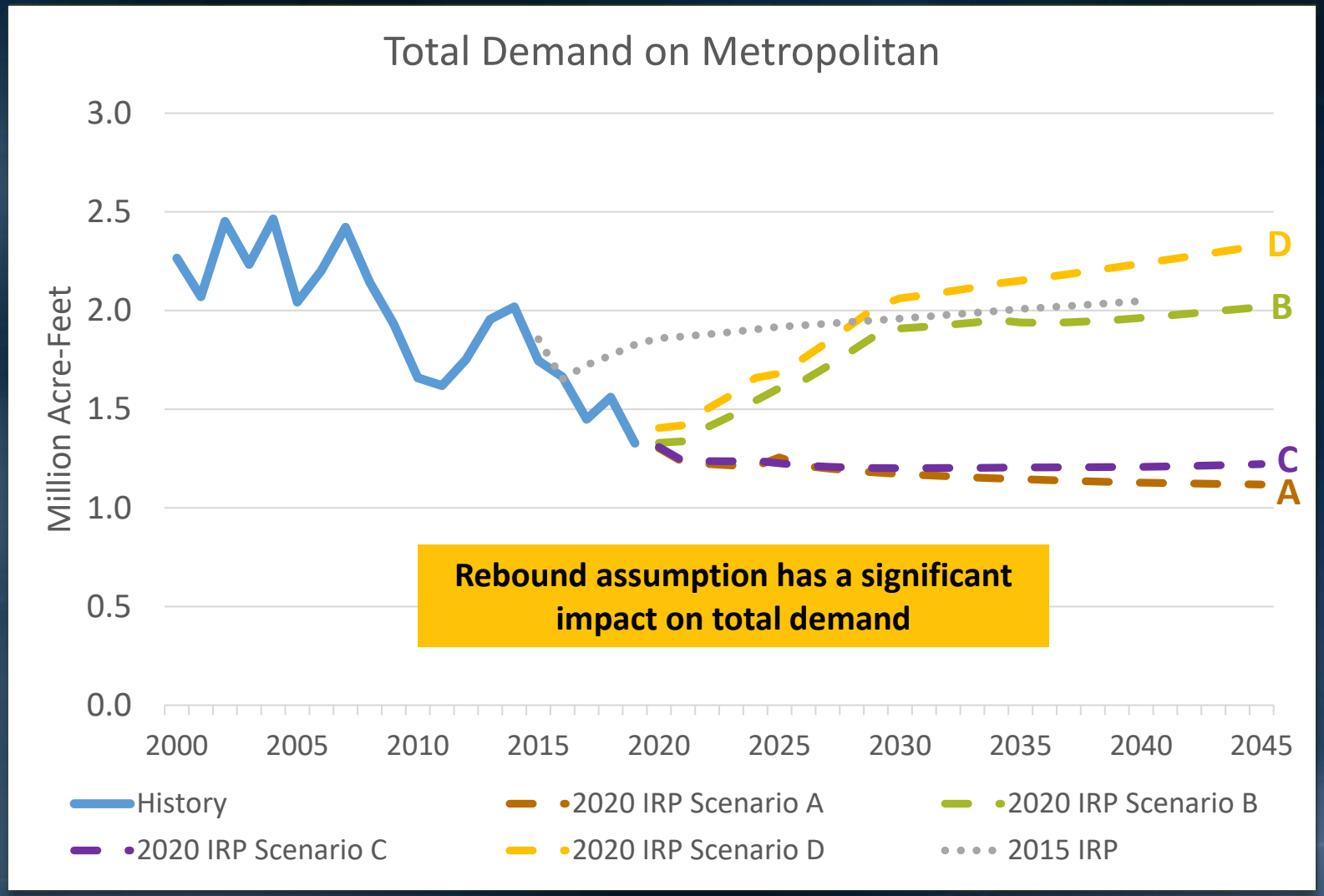


Preliminary Demands on Metropolitan



Total Demands on Metropolitan:

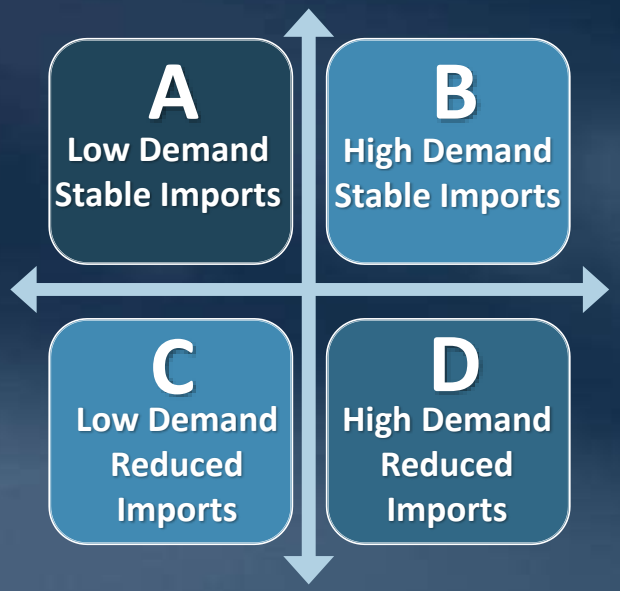
- **Retail Demand - Local Supply**



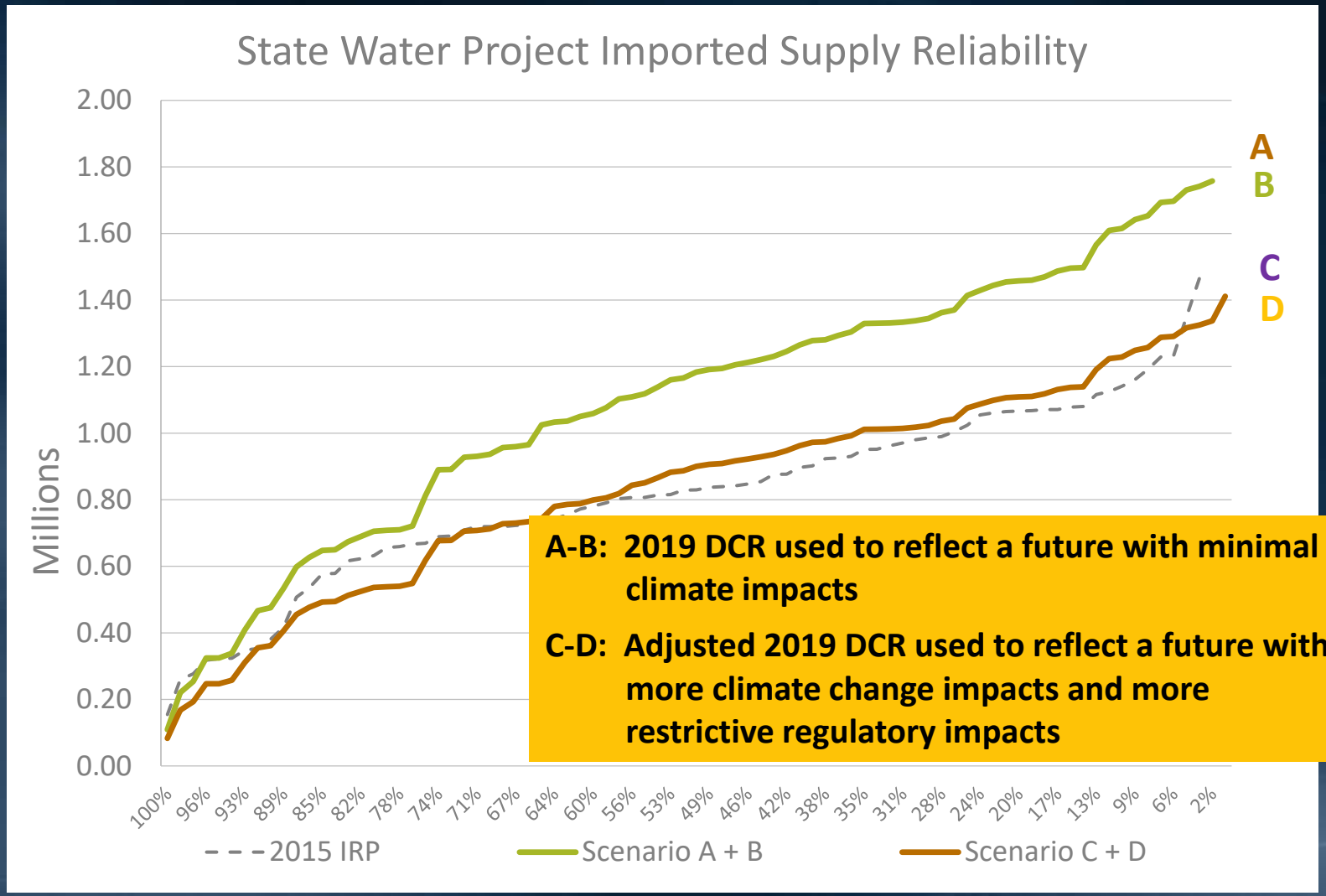
Feedback and Further Examination Underway

- Factors influencing local supply production development
- Climate change and regulatory impacts on local production
- Determine plausible level of groundwater production within each scenario

Preliminary SWP Imported Supply



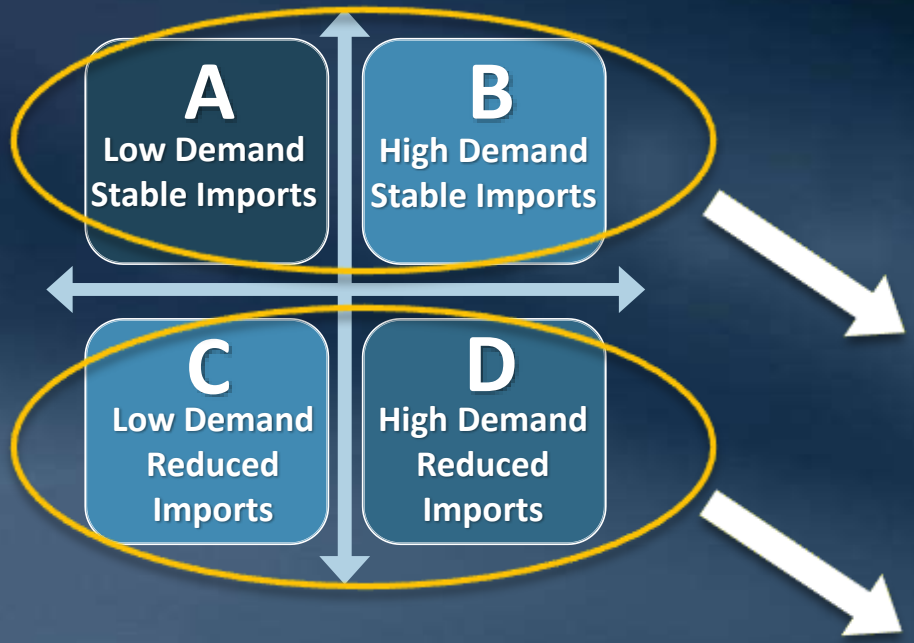
	2015 IRP	A B	C D
Average SWP Allocation	43%	58%	44%



A-B: 2019 DCR used to reflect a future with minimal climate impacts

C-D: Adjusted 2019 DCR used to reflect a future with more climate change impacts and more restrictive regulatory impacts

Preliminary CRA Imported Supply



Shortage Condition[1]	2021	2022	2023	2024	2025
August 2020 CRSS (Full Hydrology)	0%	23%	44%	49%	53%

Shortage Condition[1]	2021	2022	2023	2024	2025
August 2020 CRSS (Stress Test Hydrology)	0%	32%	55%	65%	77%

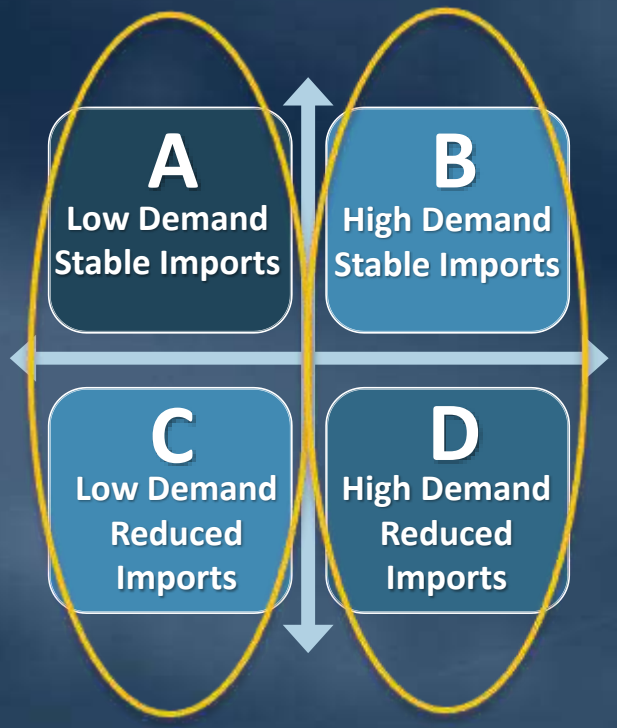
[1] Shortage Condition: Mead ≤ 1,075 ft.

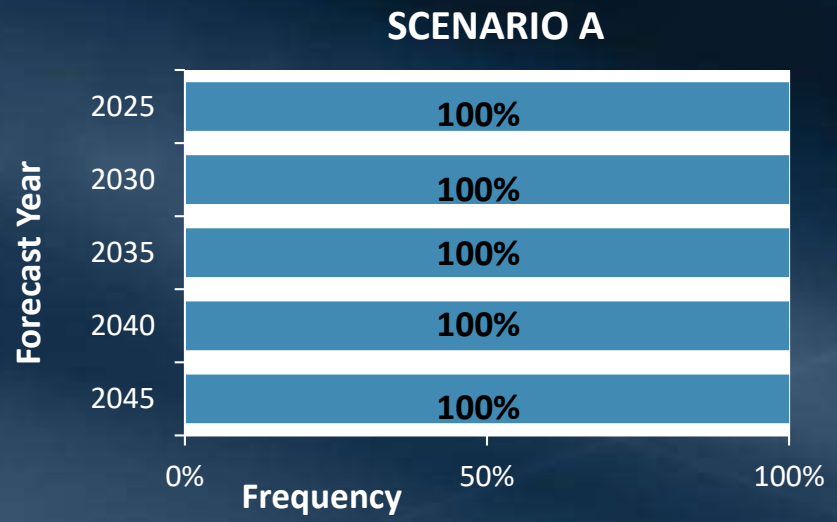
Feedback and Further Examination Underway

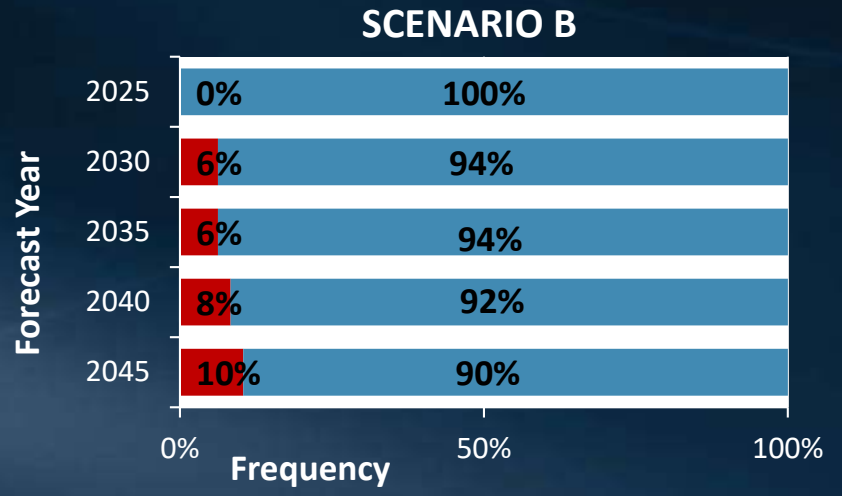
- Appropriate application of climate change impacts for both imported watersheds
- Assumptions on long-term institutional arrangements
- Regulatory impacts on both imported water supply sources

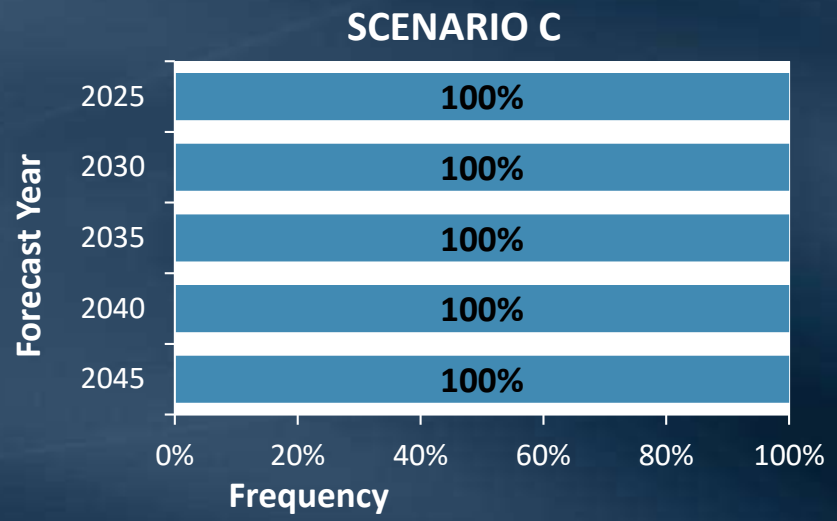
Preliminary "Gap" Analysis

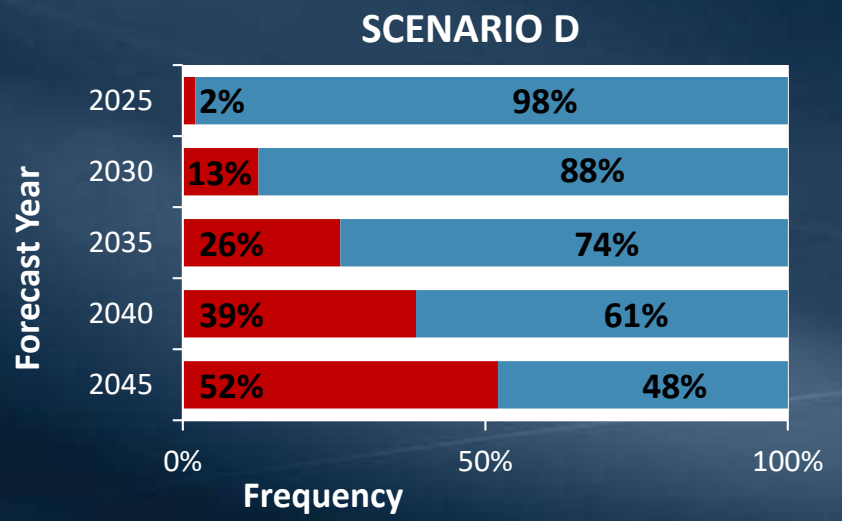
When to expect a gap and how often it occurs











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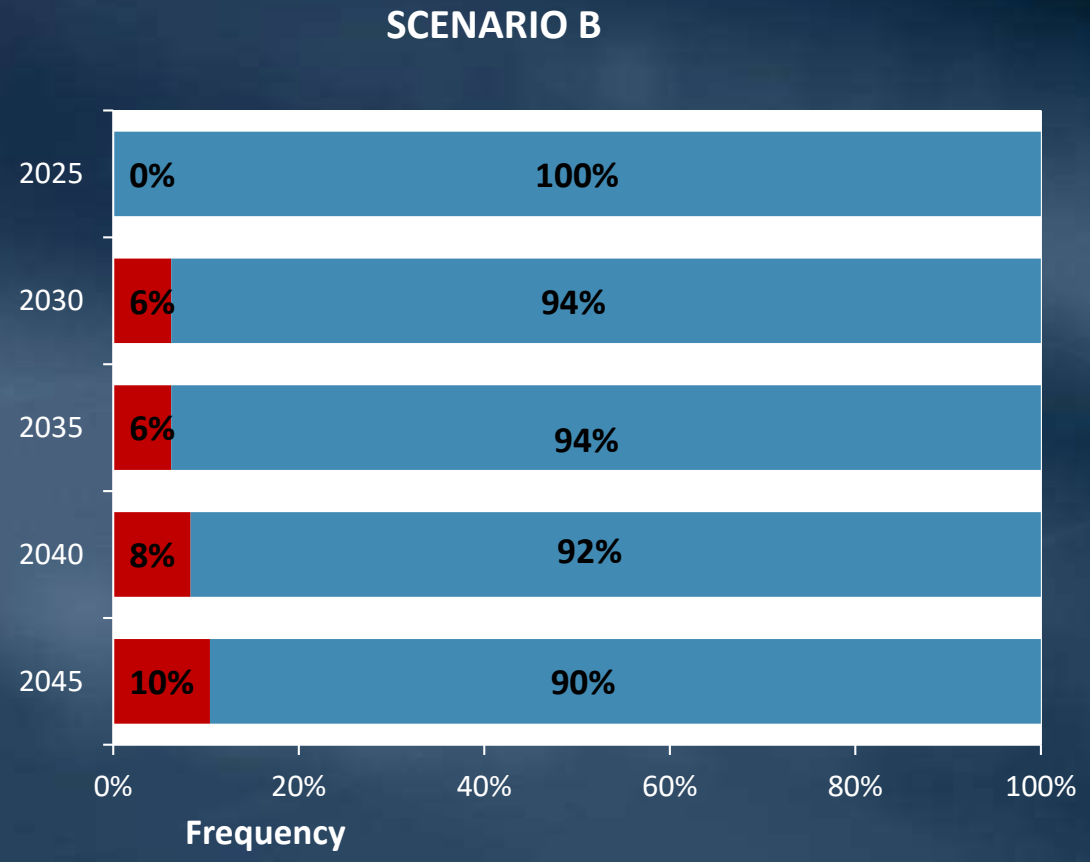
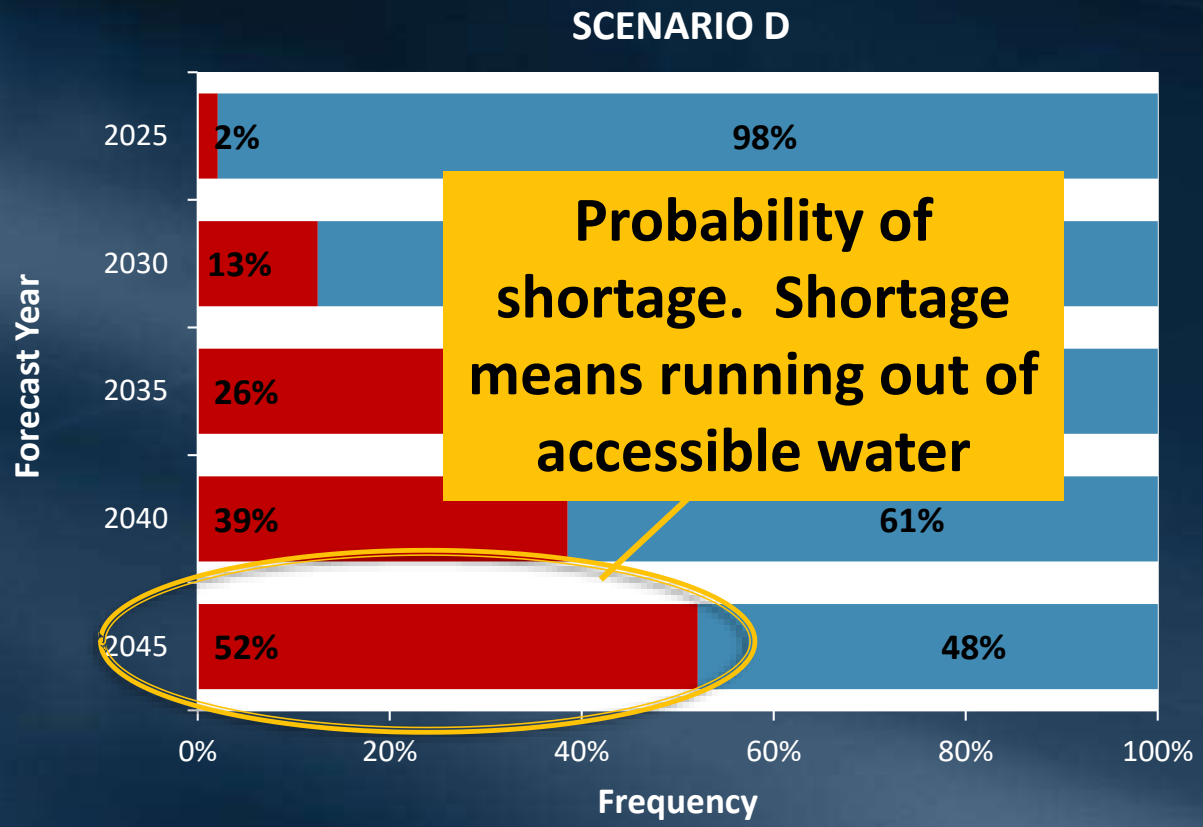
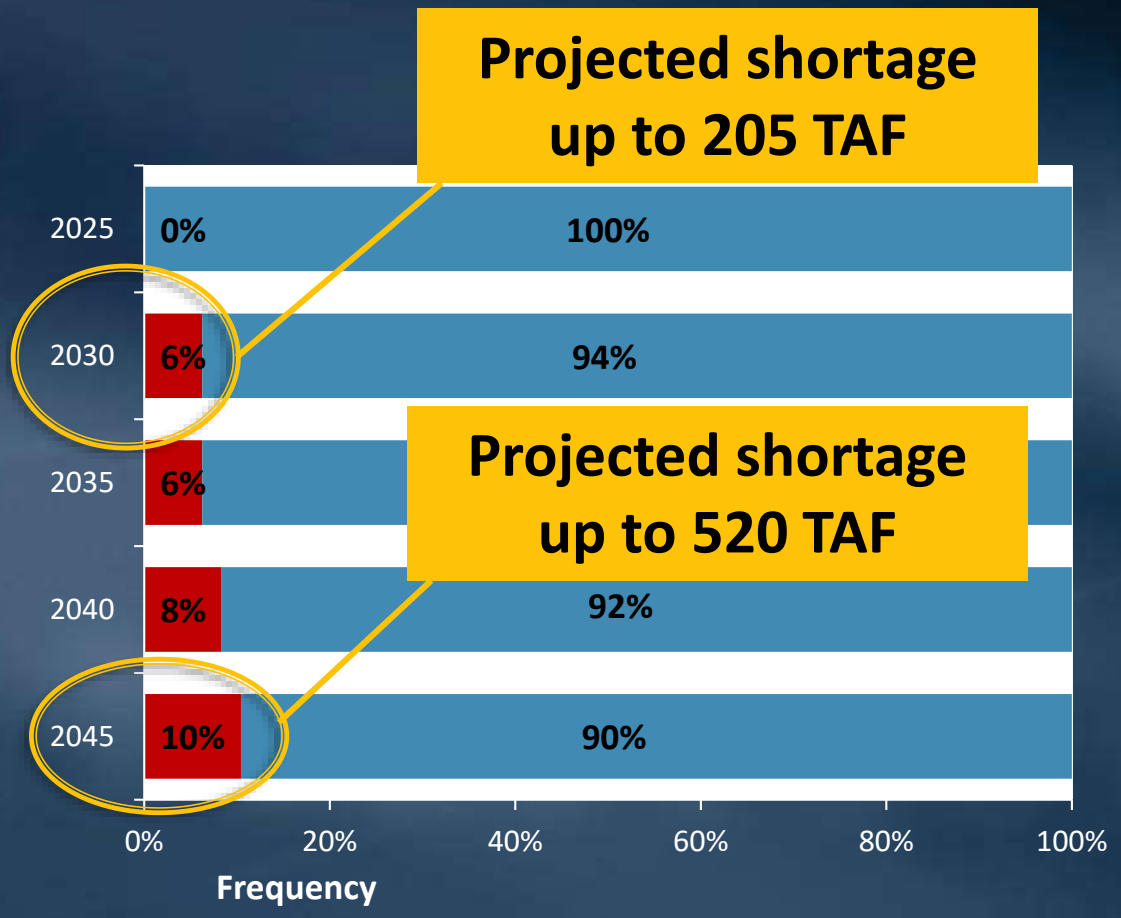
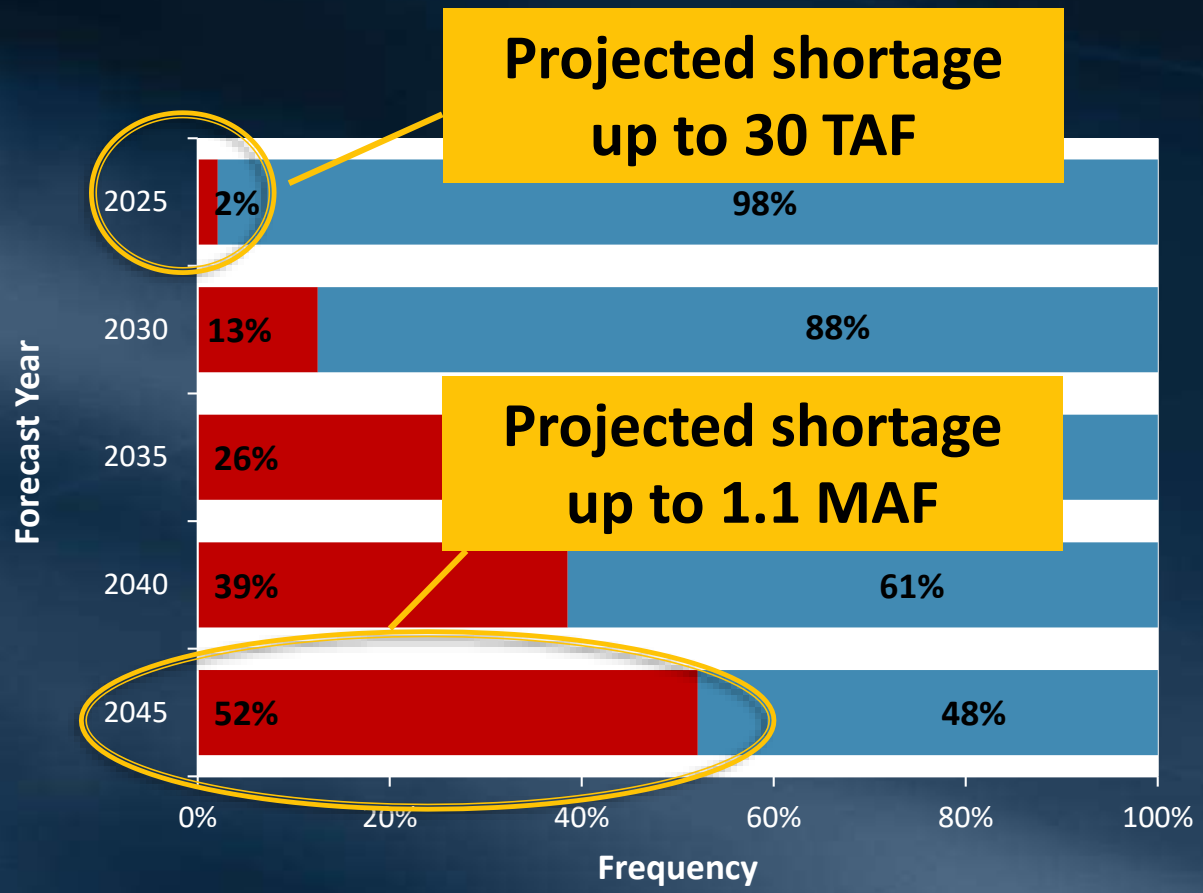




Preliminary "Gap" Analysis





Experts

Demand Experts

- Kurt Schwabe Ph.D.
  Assoc. Dean/Chair & Prof of Environmental Economics & Policy, UC Riverside
  Adjunct Fellow, Water Policy Center, Public Policy Institute of California (PPIC)
  - Dr. Schwabe's research focuses on economic issues associated with water use, agricultural production, urban water conservation, ecosystem services, and environmental regulation. His papers have appeared in wide range of peer-reviewed publications, including ***Nature Sustainability***, ***Proceedings of the National Academy of Sciences***, ***Journal of Risk and Uncertainty***, ***Land Economics***, and the ***American Journal of Agricultural Economics***, and is co-editor of two recent books on water titled, Drought in Arid and Semi-Arid Regions: A Multi-Disciplinary and Cross-Country Perspective, and The Handbook of Water Economics.

Demand Experts

- Lisa Maddaus P.E.
  CFO, Senior Engineer - Maddaus Water Management Inc.
  - Senior water resources engineer with experience preparing water resources planning studies for water suppliers across the country. Her passion is integrated water resources planning, and her specialty is in conservation, drought and climate change planning
- Dan Rodrigo
  Vice President - CDM Smith
  - Specializes in integrated water resources planning and decision science, and has utilized specialized computer tools and management techniques to help garner stakeholder consensus and develop water plans with adaptive management strategies

Demand Experts

- Tom Chesnutt Ph.D., Pstat, CAP
  CEO, A&N Technical Services, Inc.
  - Pioneered innovative water rate reform, probability management, stochastic simulation and forecasting in the fields of water policy and economic modeling
- Stephen Levy
  Director and Senior Economist - Center for Continuing Study of the California Economy
  - Specializes in regional job projections for California regional planning agencies, including understanding of national, state and regional job trends and projections and assessments of regional competitiveness conditions and the implications for public policy. He has prepared growth forecasts for regional agencies including ABAG, SACOG, SCAG, AMBAG and SBCAG and for the City of San Jose

Climate Change Experts

- Heather Cooley
  Director of Research – Pacific Institute
  - Conducts and oversees research on an array of water issues, such as sustainable water use and management, the connections between water and energy, and the impacts of climate change on water resources
- Julie Vano
  Director of Research – National Center for Atmospheric Research
  - Research interests include hydrology, water resource management, science policy, climate change impacts, and system dynamics. Her current work aims to better connect climate science and the applications community and use these connections to develop innovative ways to address climate impacts on local water resources

Climate Change Experts

- Brad Udall
  Senior Water & Climate Research Scientist, Colorado Water Institute - Colorado State University
  - Specializes in the impacts of climate change on water resources in the American West
- Alex Hall
  Professor in the Department of Atmospheric and Oceanic Sciences and Institute of the Environment and Sustainability and Director of the Center for Climate Science - UCLA
  - Specializes in the development of *downscaling* techniques to understand climate change at the scales most relevant to people and ecosystems and use these techniques to create neighborhood-scale projections of future climate

Next Steps

Next Steps – Refine Preliminary Analysis

- Continue staff investigations and consult with Experts and Member Agencies
  - Refine assumptions for local supply, demand, and imported supply
  - Continue quantification
- Develop “Gap Analysis” under refined assumptions
- Draft Action Portfolios
- Policy Discussion


THE METROPOLITAN WATER DISTRICT OF
SOUTHERN CALIFORNIA
1928