



WATER  **TOMORROW**
2020 Integrated Resources Plan

DISCUSSION OF IRP PORTFOLIOS AND KEY FINDINGS

IRP Technical Workgroup Meeting

November 16, 2021

OVERVIEW

- Analysis Objectives
- Interpreting Graphics
- Portfolio Discussion
- Key Findings
- Next Steps

IRP PHASING

- Phase 1 – Needs Assessment

- *Scenario Development*
- *Gap Analysis*
- *Portfolio Category Analysis*
- *Board Adoption of IRP Findings*

Completes in 2021

- Phase 2 - Implementation

- *Selection of robust actions through specific project identification*
- *Adaptive Management Plan*

Begins in 2022

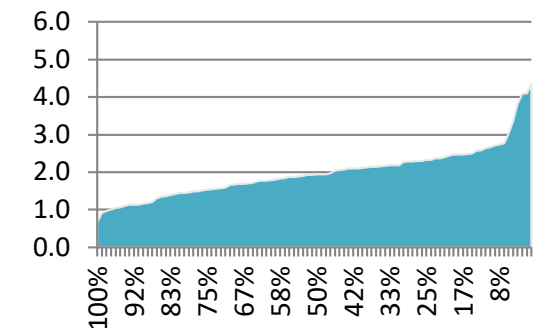
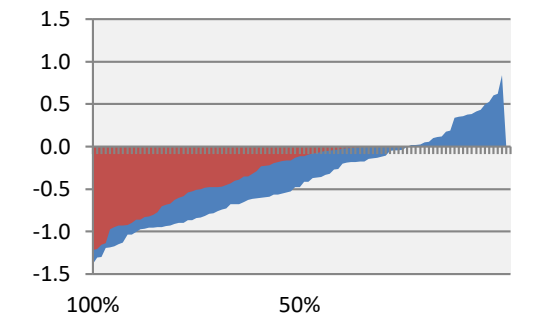
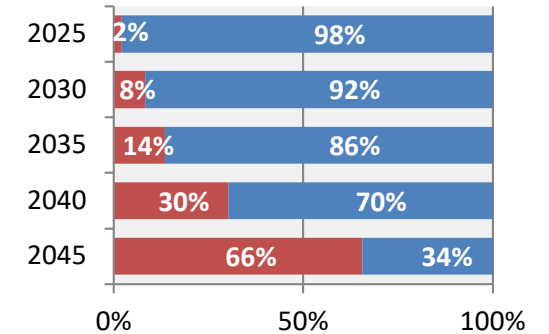
PORTFOLIO CATEGORY ANALYSIS OBJECTIVES

- Incorporate uncertainty of the major drivers into the scenario analysis framework
- Assess reliability challenges in each scenario
- Identify high level resource category solutions to the reliability challenge
- Identify takeaways from the scenario analysis to develop findings that can be used in developing implementation approaches and an adaptive management strategy

INTERPRETING GRAPHICS

INTERPRETING GRAPHICS

- “Football Field” Graphs
 - Frequency and timing of shortages and surplus
- Shortage/Surplus Curves
 - Exceedance curves provide magnitude and probability of shortage and surplus
- Storage Graphs
 - End of year probability of storage levels

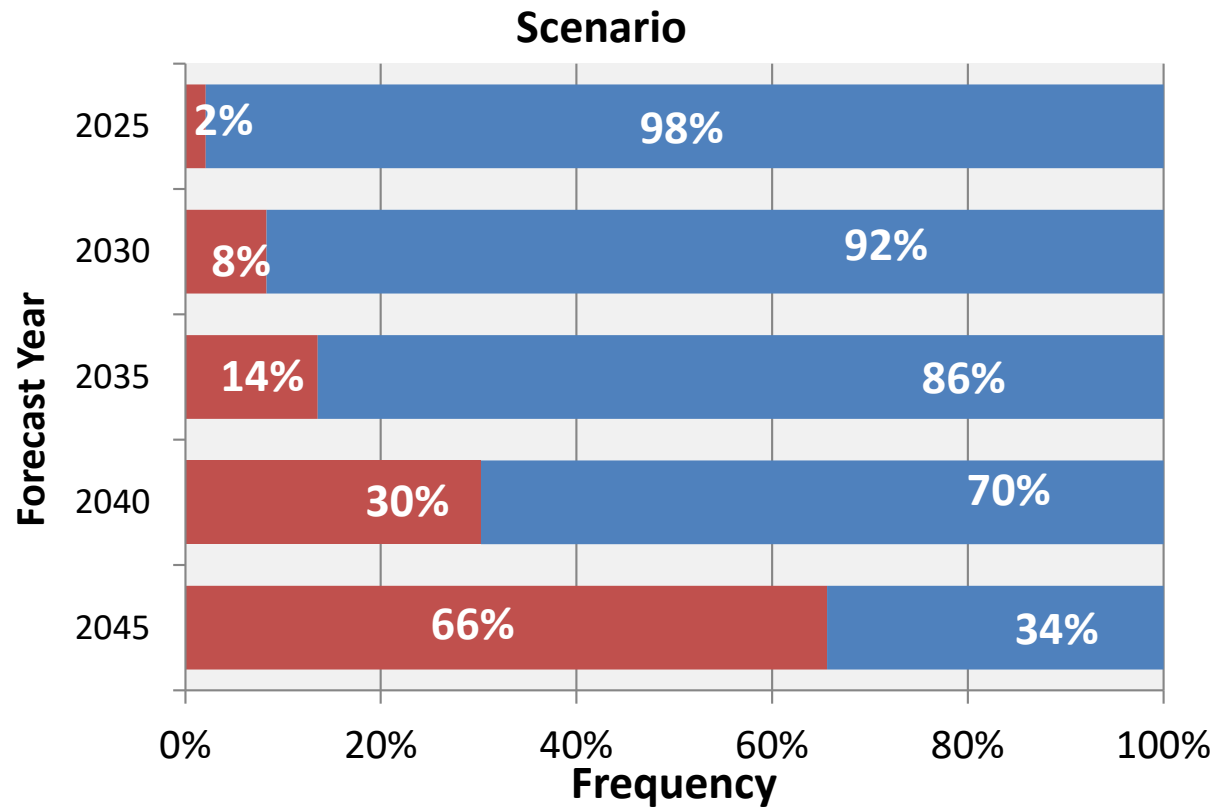


“FOOTBALL FIELD” GRAPH

Frequency and Timing of Shortages

Red bars indicate the frequency of shortage conditions

Shortage means:
Running out of accessible supply somewhere in MWD’s service area



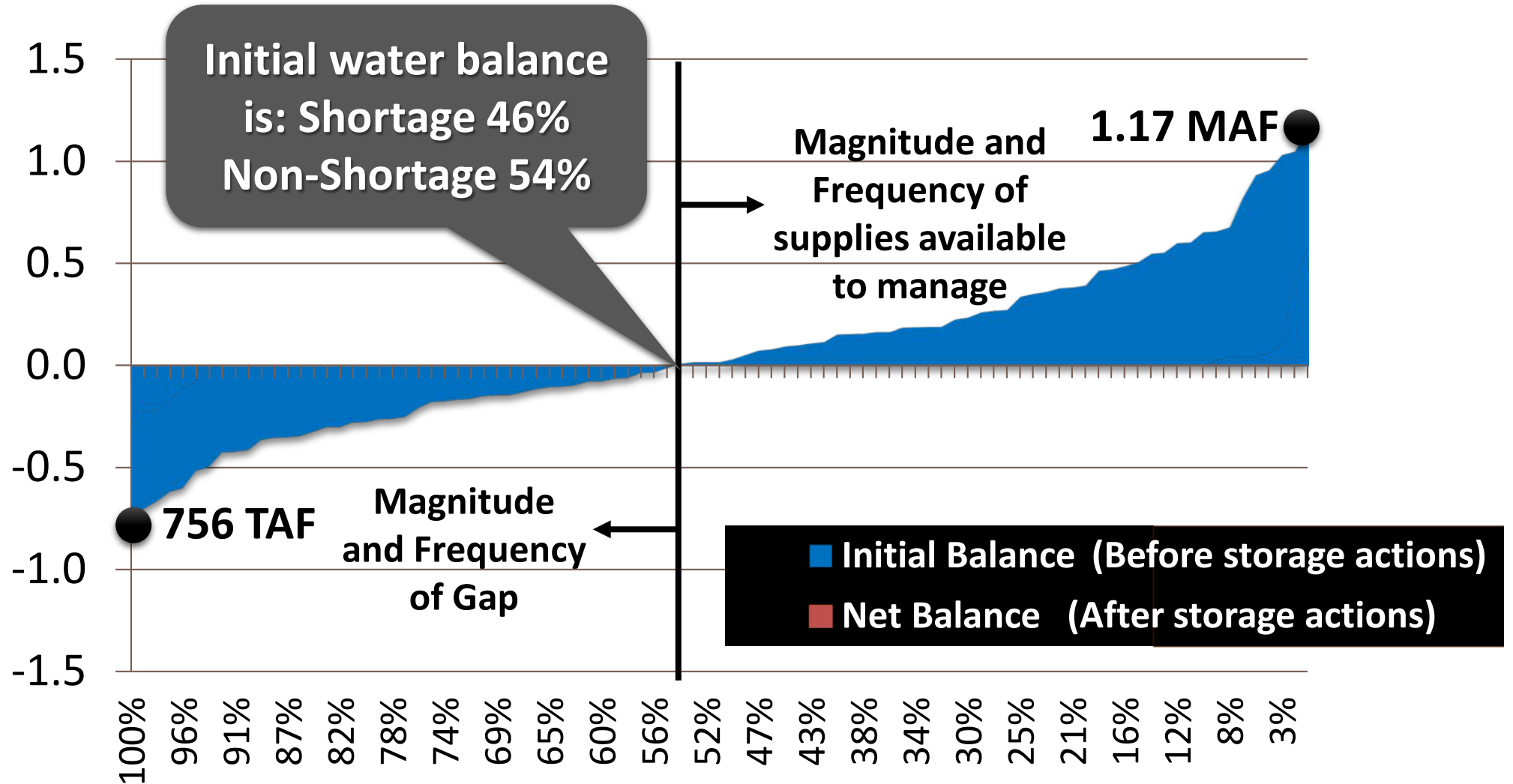
Blue bars indicate the frequency of non-shortage conditions

Non-Shortage means one or a combination of:

- Balanced condition
- Demands are met through storage
- Surplus supply to manage

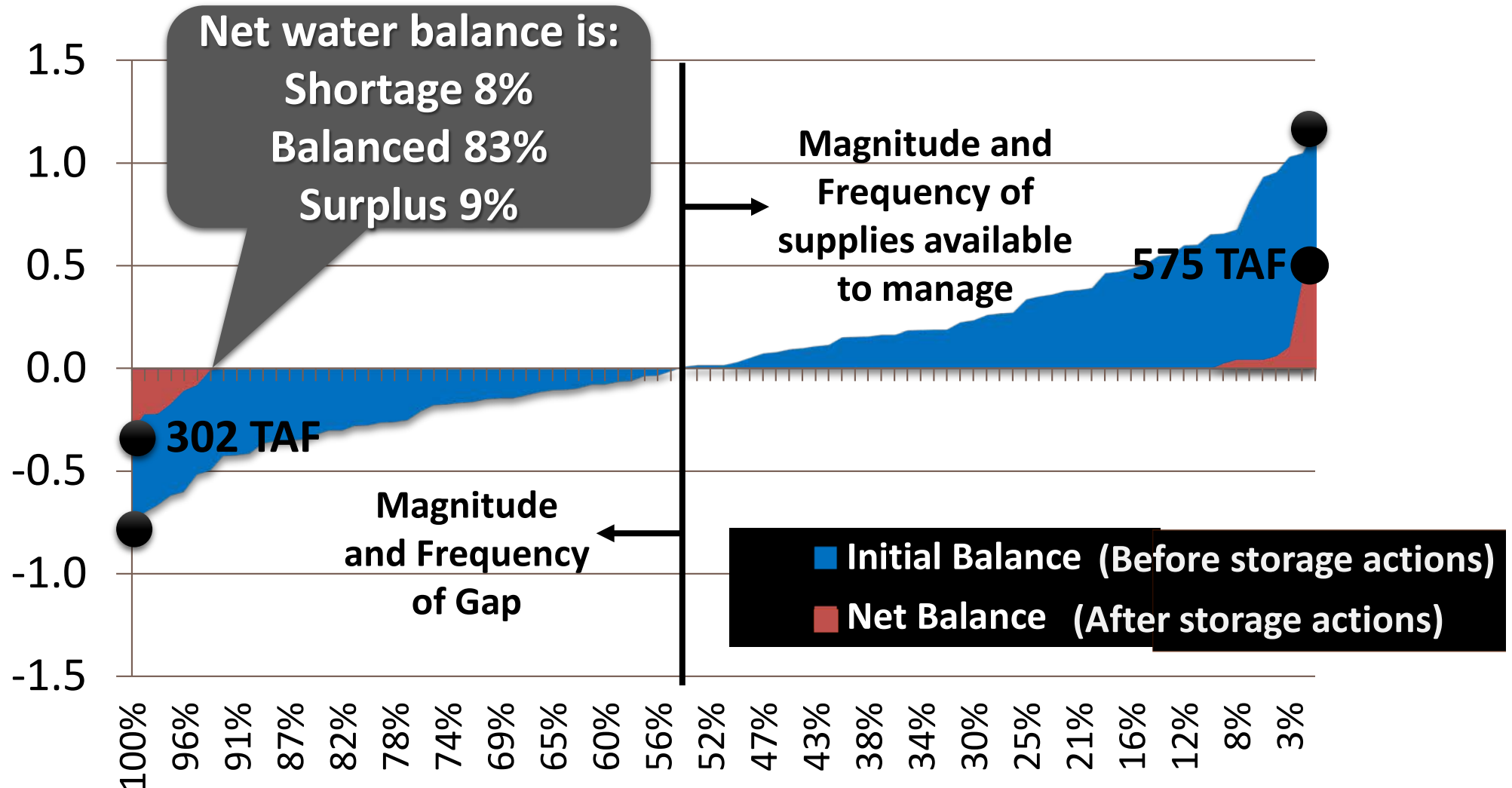
SHORTAGE / SURPLUS CURVE

Magnitude and Probability of Surplus and Shortage



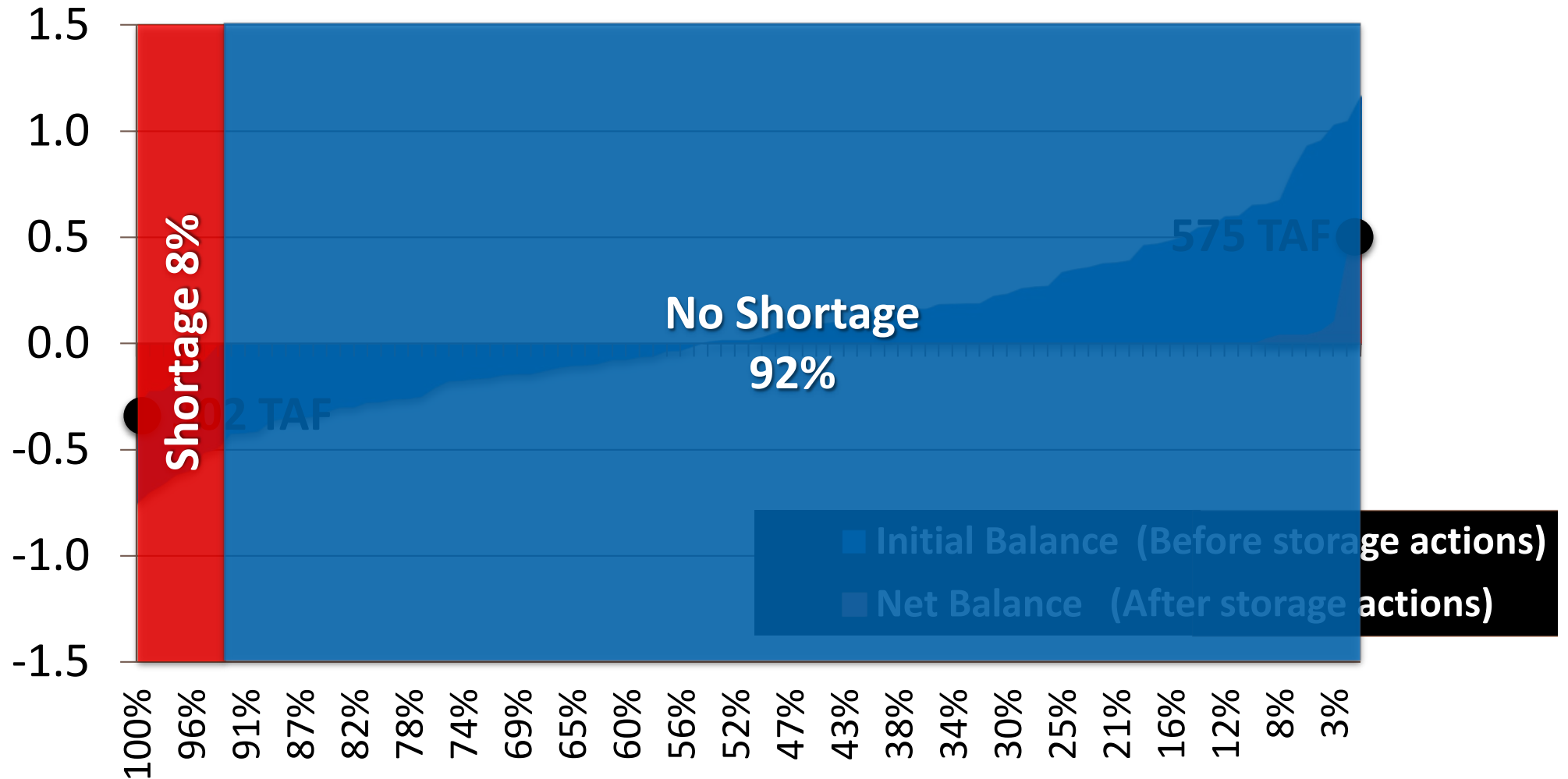
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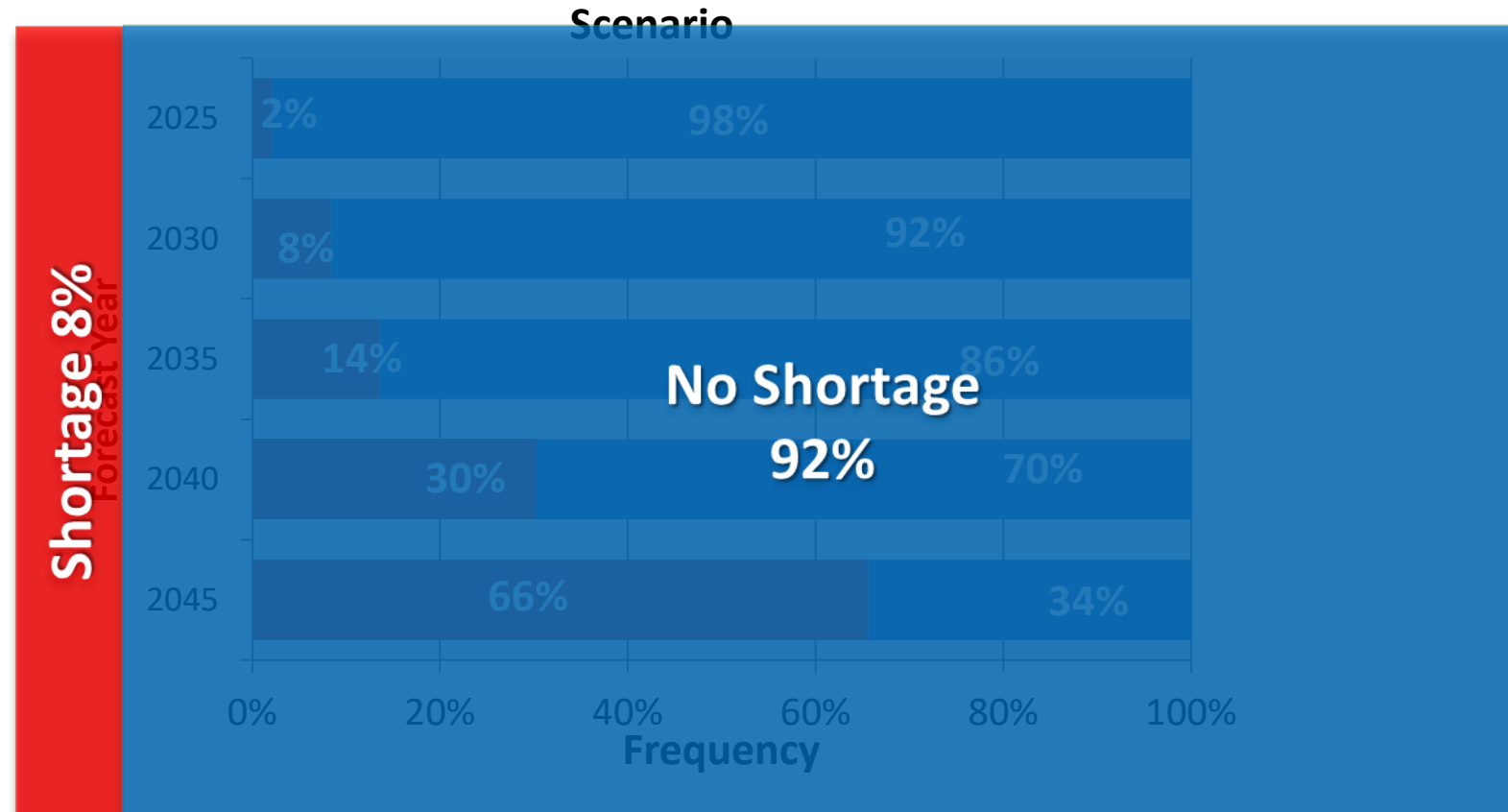
SHORTAGE / SURPLUS CURVE

Magnitude and Probability of Surplus and Shortage



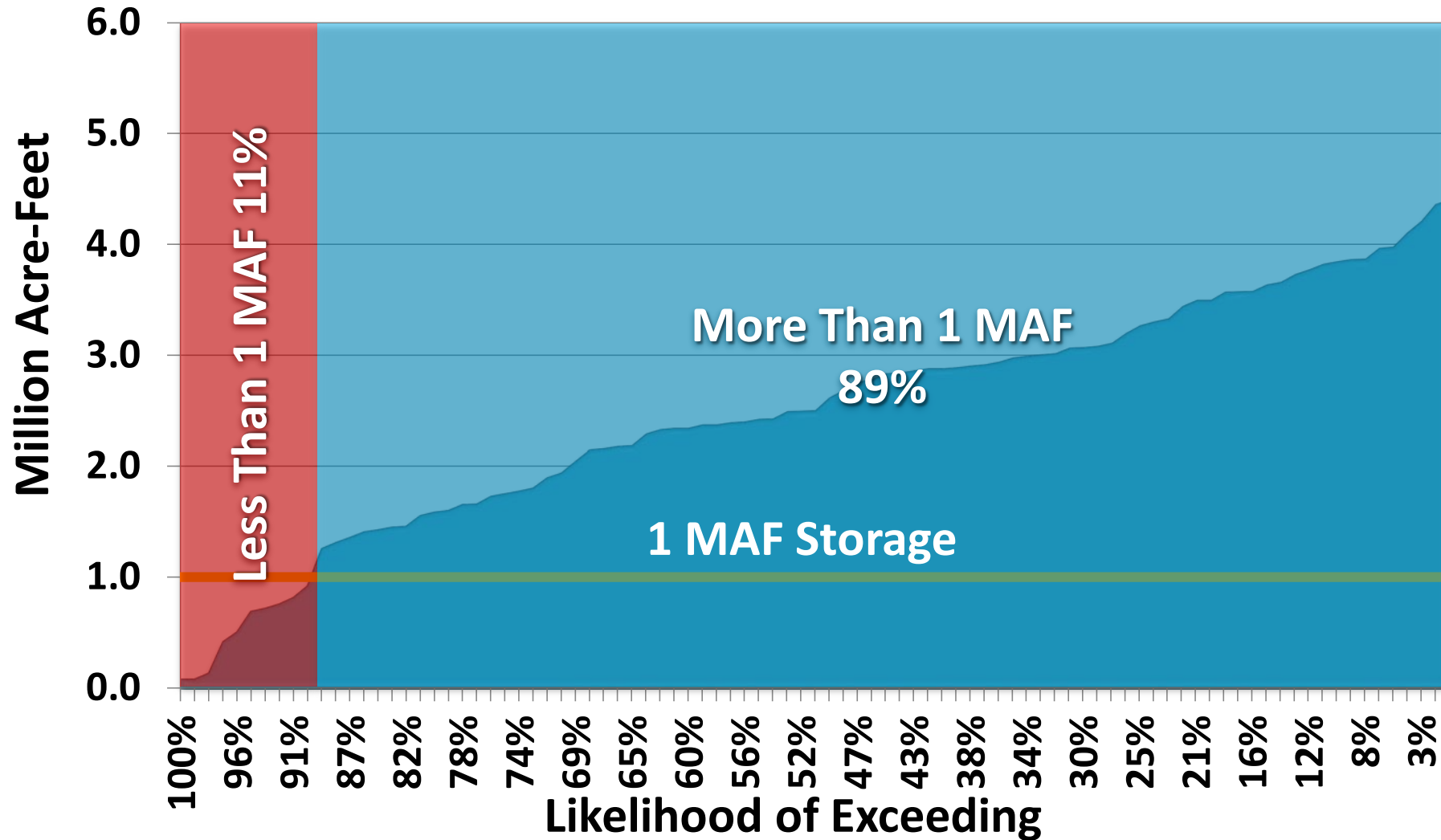
“FOOTBALL FIELD” GRAPH

Frequency and Timing of Shortages



STORAGE GRAPH

End of Year Probability of Storage Levels



*Excludes
Emergency
storage

PORTFOLIO DISCUSSION

PORTFOLIO PLANNING CATEGORIES

- Core Supply/Demand Reduction

- *A supply that is generally available and used every year to meet demands under normal conditions and may include savings from efficiency gains through structural conservation*

High reliability and value if used often. Expensive otherwise.

- Flexible Supply/Demand Response

- *A supply that is implemented on an as-needed basis and may or may not be available for use each year and may include savings from focused, deliberate efforts to change water use behavior*

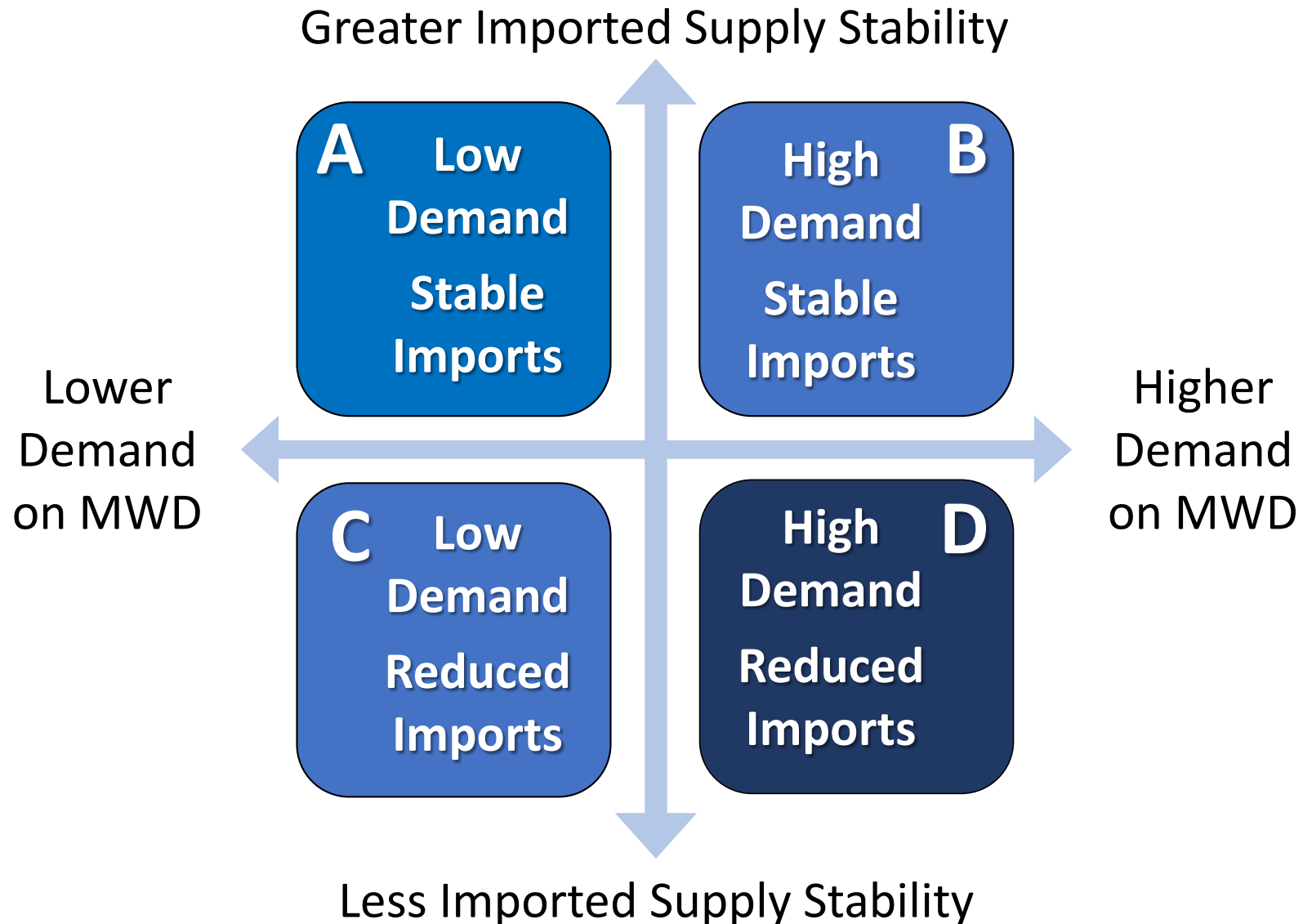
Expensive if used too much or too often. Better value if used occasionally.

- Storage

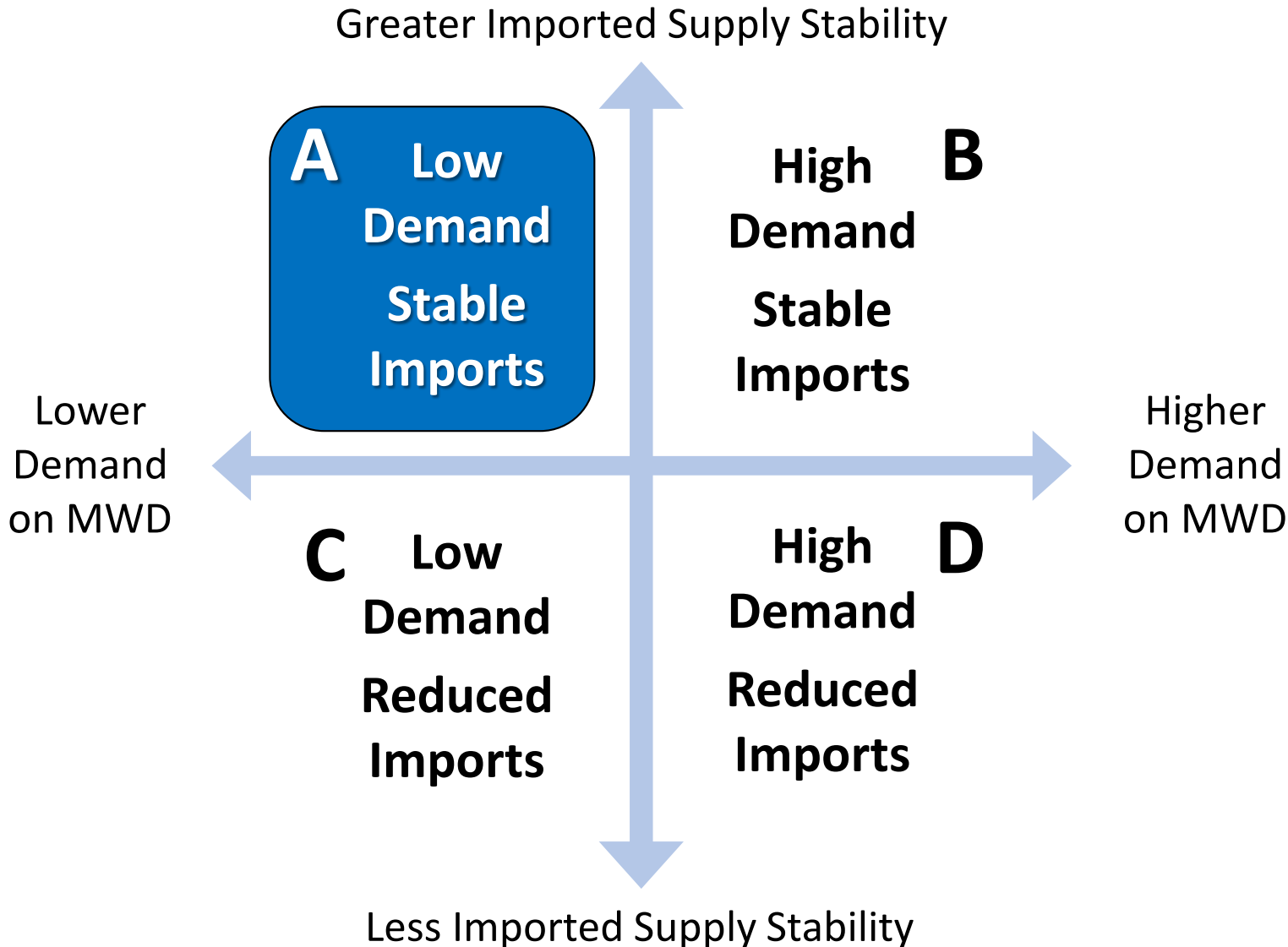
- *The capability to save water supply to meet demands at a later time*

Converts Core Supply into Flexible Supply. Evens out variability in supply and demand.

IRP SCENARIO RECAP



SCENARIO A

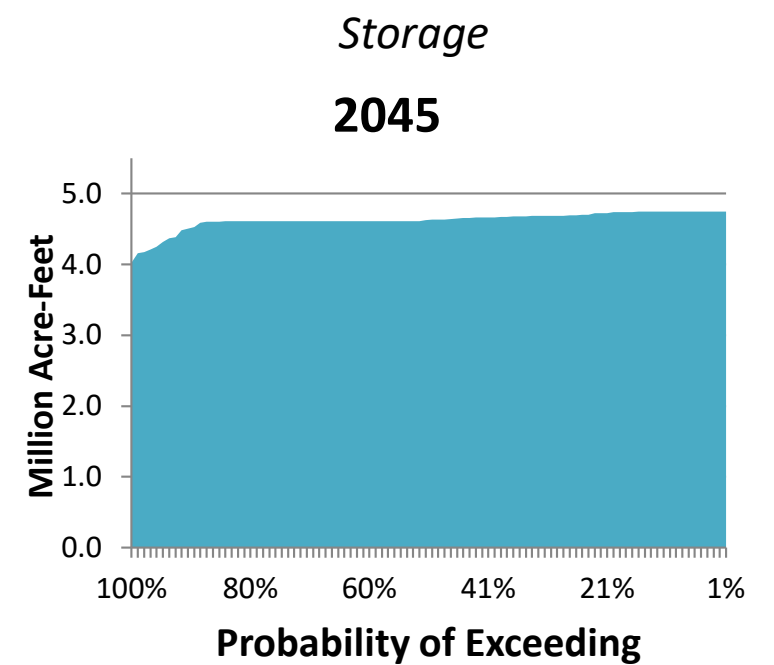
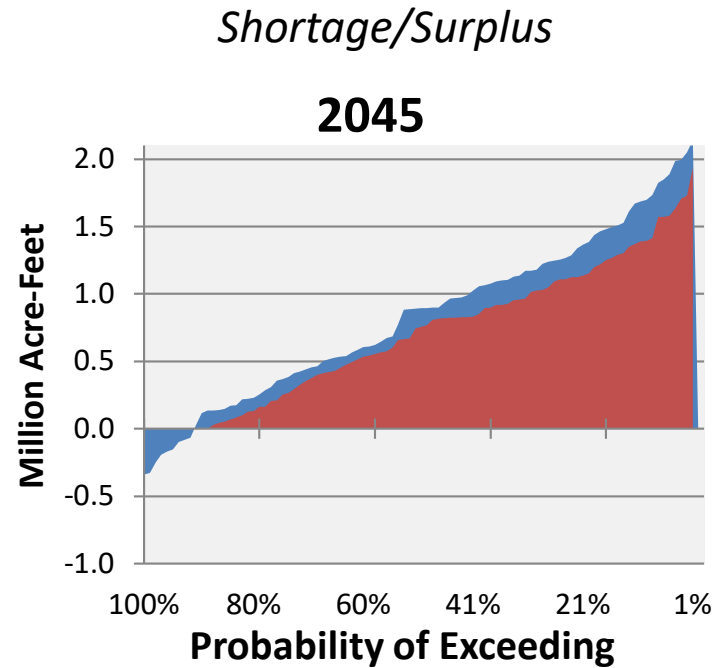
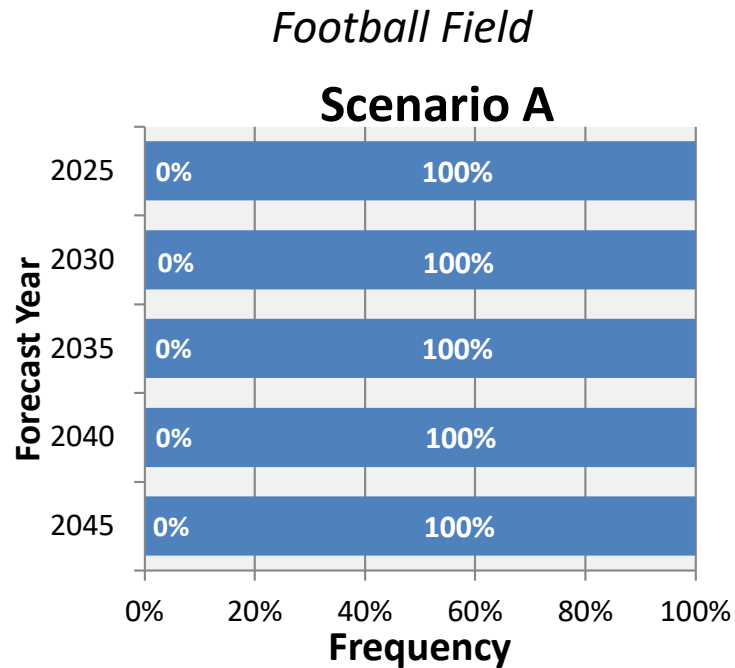


Scenario A

This scenario is driven by a combination of **plentiful regional and local supplies**, a **struggling economy**, **low population growth**, and a **continuing water use ethic** across the region.

Least challenging overall reliability outlook of the four IRP scenarios

SCENARIO A – GAP ANALYSIS FINDINGS



- Shortages are addressed with existing resources and storage programs/supplies
- Unable to manage up to 770 TAF of surplus supply 50% of the time
- End of year storage is above 4.5 MAF 89% of the time by 2045

SCENARIO A – PORTFOLIO CATEGORY ANALYSIS

Takeaways

- No new investments in Core, Flexible or Storage are necessary provided the assumed demand and supply levels are maintained
- Combination of lower demand and stable supplies are end-user initiated without additional intervention from Metropolitan

SCENARIO B

Greater Imported Supply Stability

A Low Demand
Stable Imports

B High Demand
Stable Imports

C Low Demand
Reduced Imports

D High Demand
Reduced Imports

Lower Demand on MWD

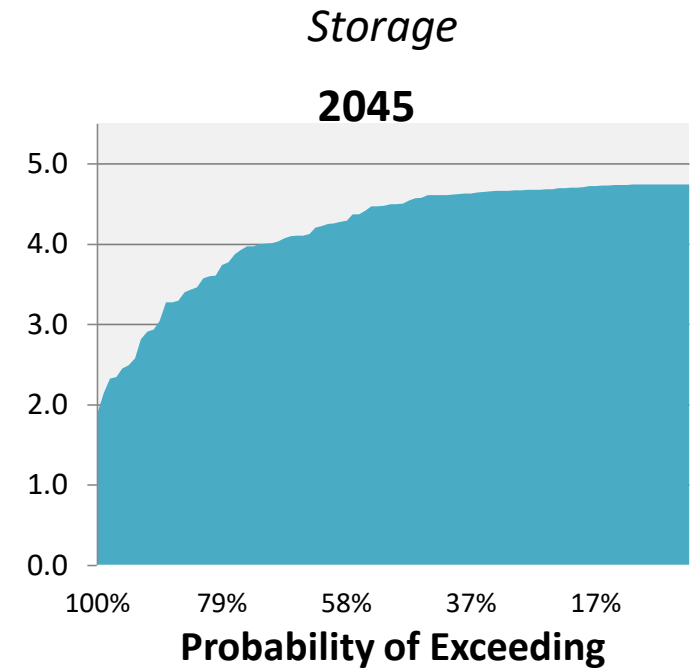
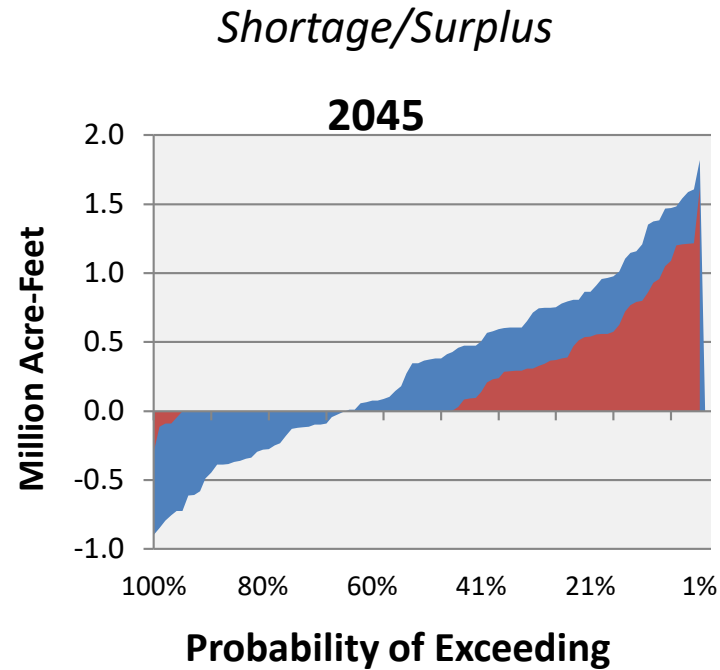
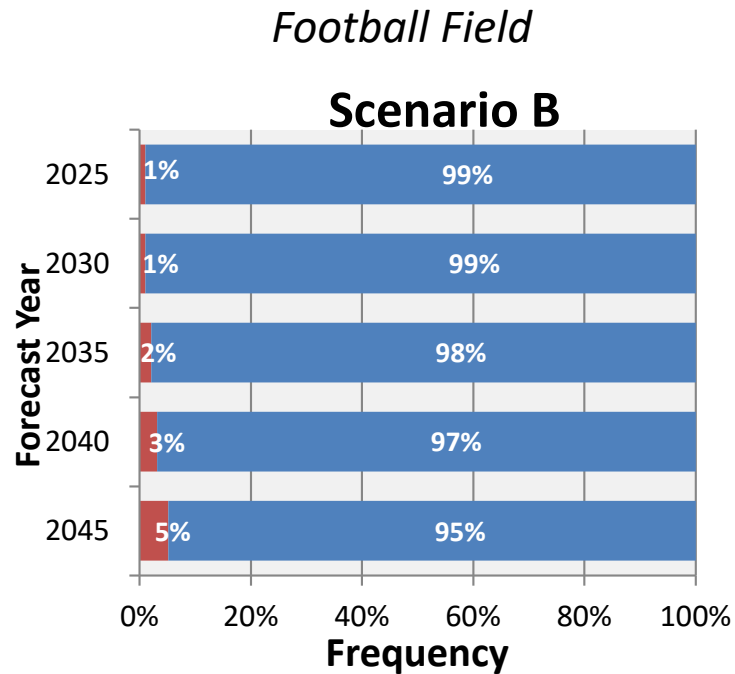
Higher Demand on MWD

Less Imported Supply Stability

Scenario B

This scenario reflects increasing retail demands across the region resulting from relatively high population growth and a strong economy. Fortunately, climate change impacts are manageable and imported supplies remain stable.

SCENARIO B – GAP ANALYSIS FINDINGS

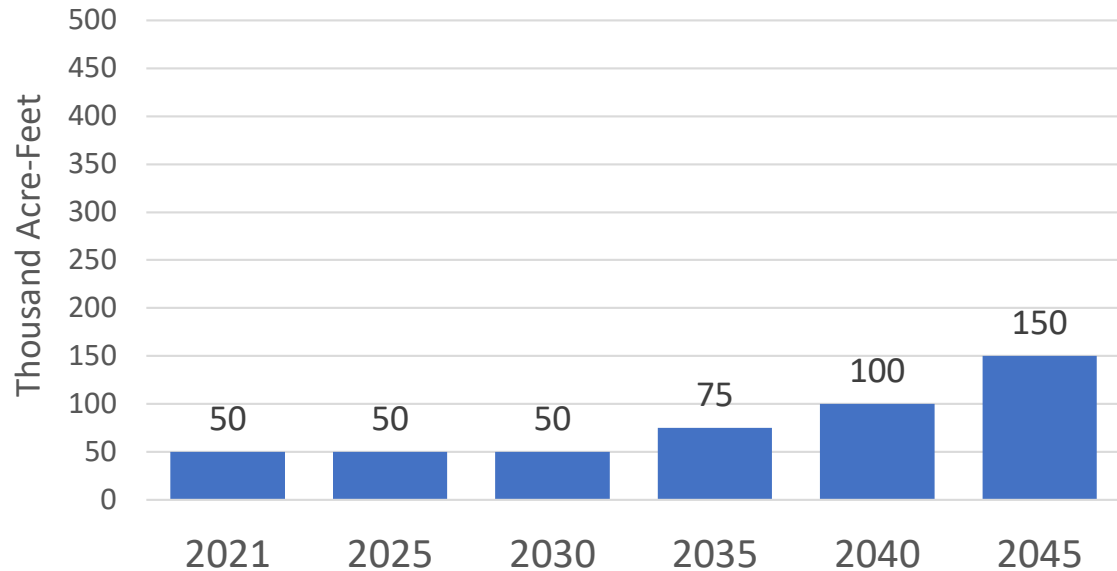


- Shortages occur between 1-5% of the time through planning horizon
- Up to 300 TAF of shortage in 2045
- End of year storage is above 4.5 MAF 50% of the time by 2045

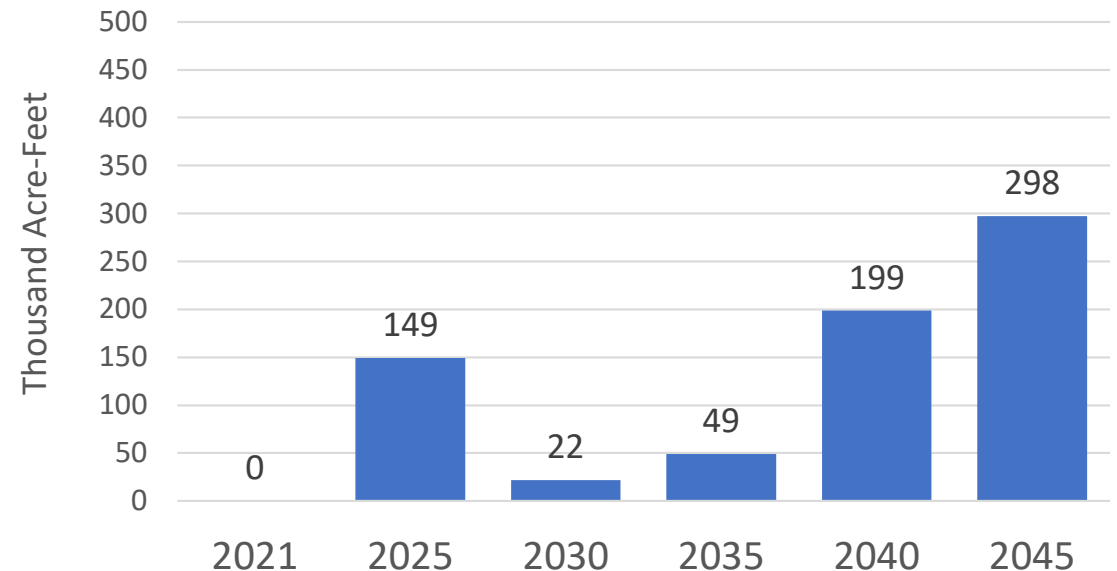
SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

Each Portfolio Category in Isolation

Core Supply Only



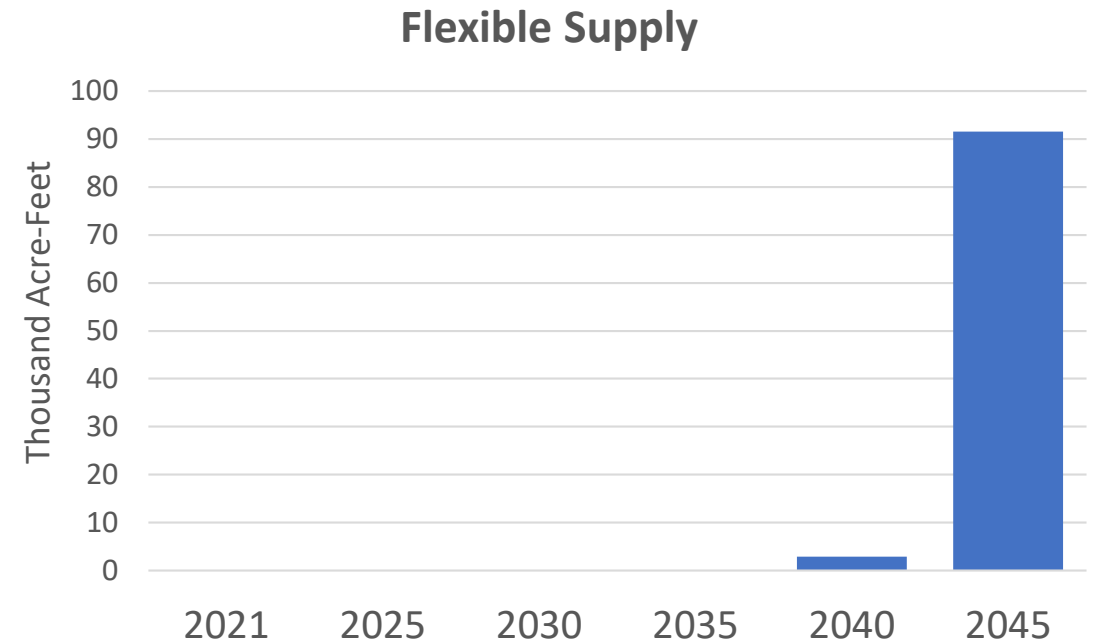
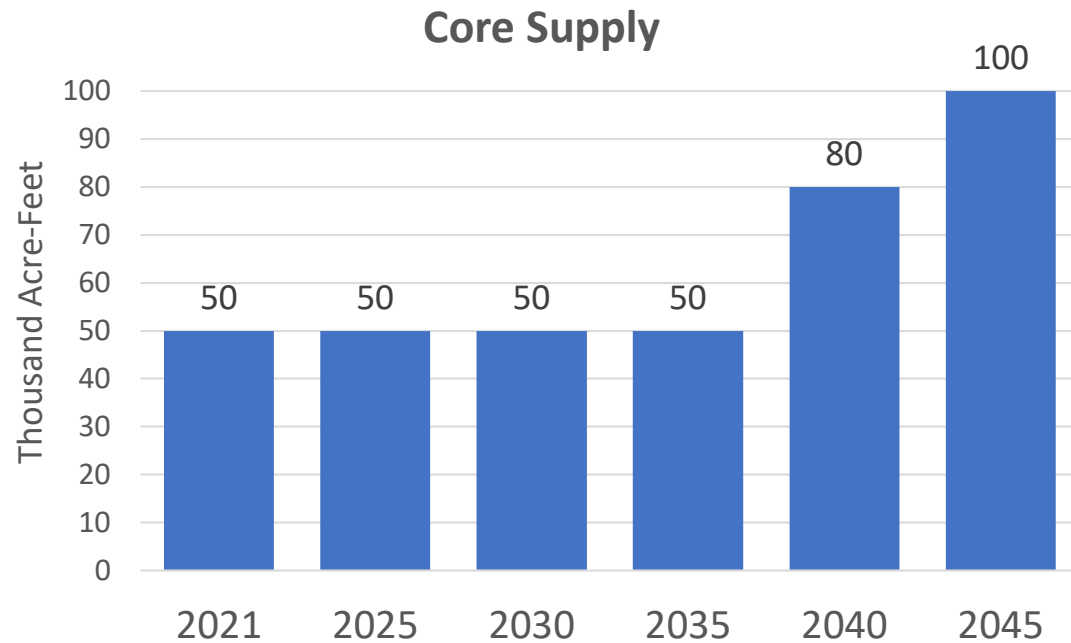
Flexible Supply Only



Storage Only: 500,000 AF of new storage capacity with a 250,000 AFY put/take capacity will eliminate shortage (except for 1% in 2045), *if that storage can reach the “SWP Dependent” areas*

SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

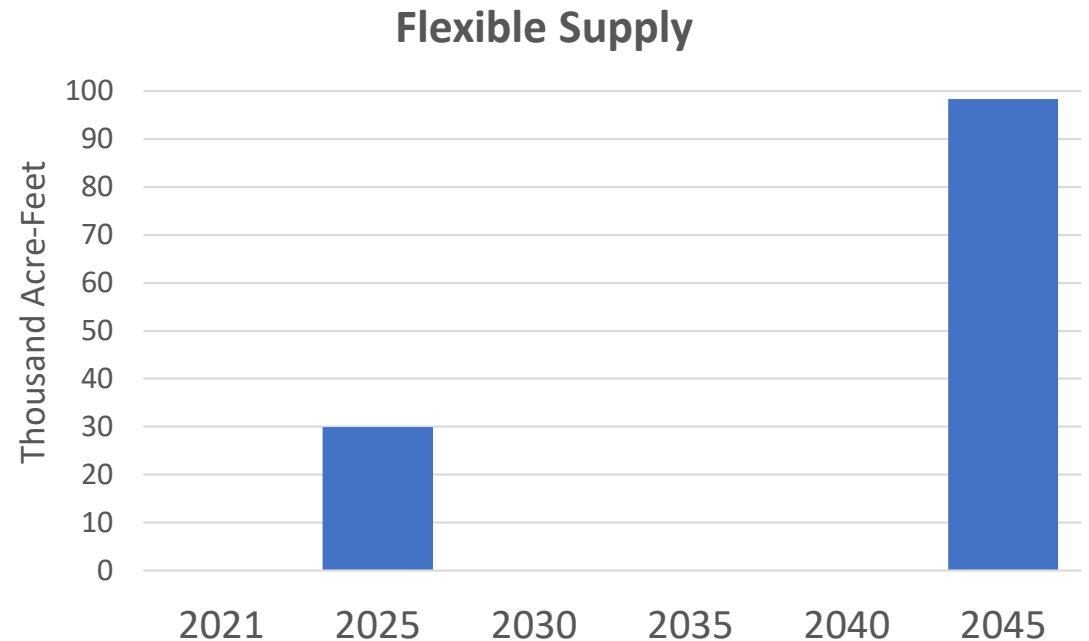
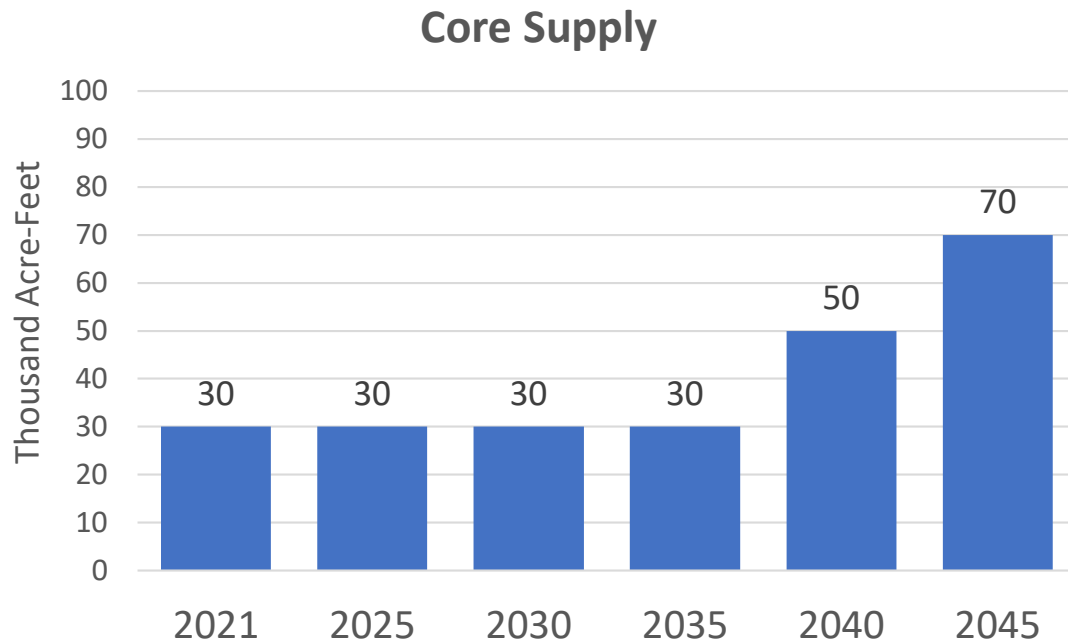
Mix of Portfolio Categories



Storage: No Additional Storage

SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

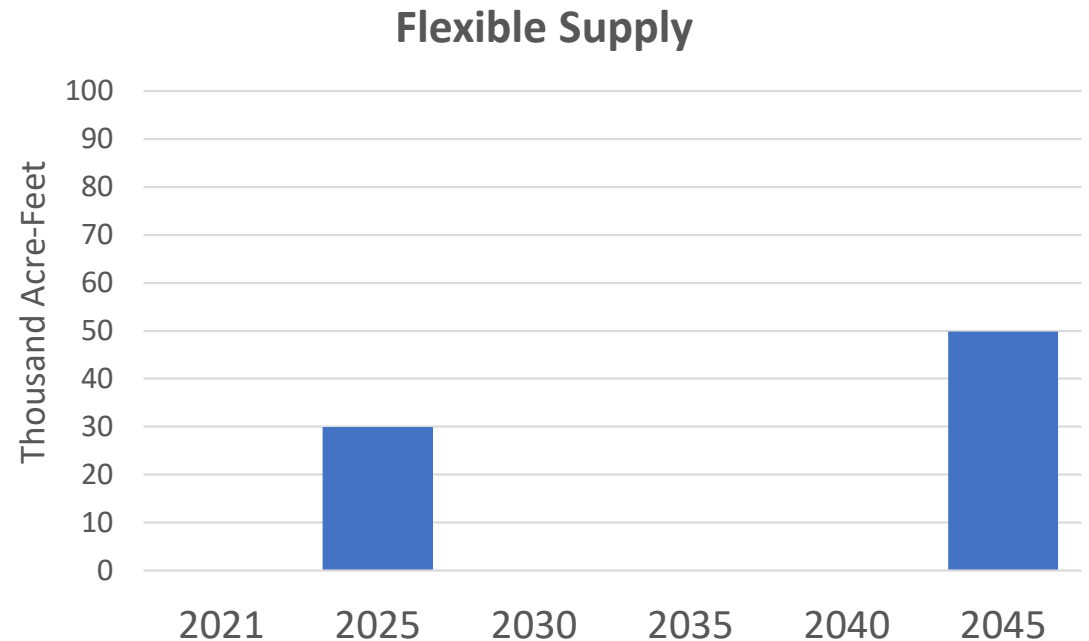
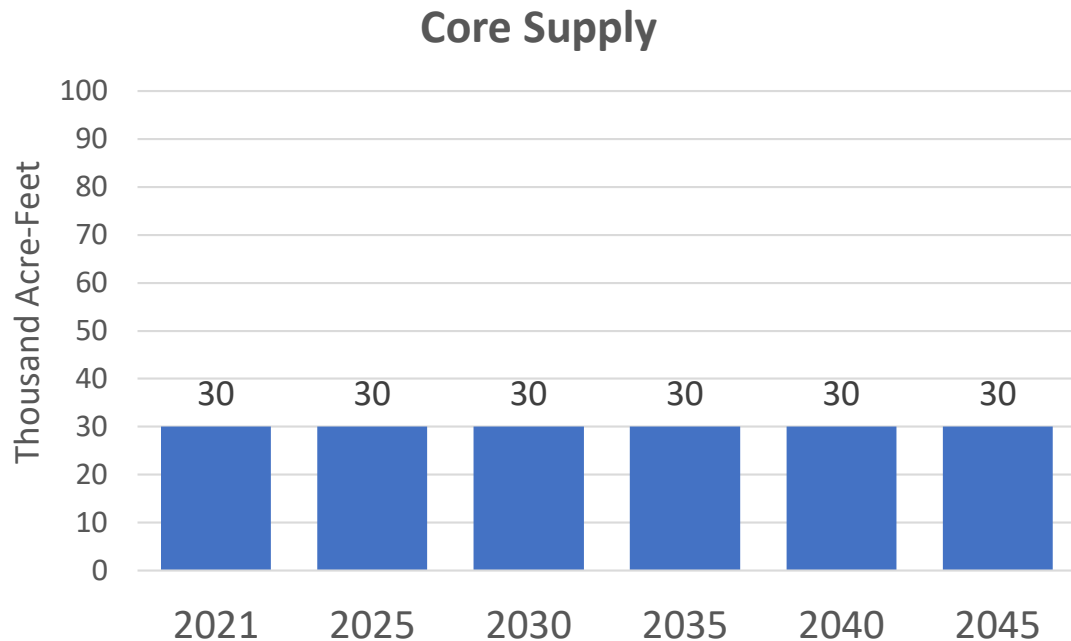
Mix of Portfolio Categories



Storage: 100,000 AF with 50,000 AFY put/take capacity

SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

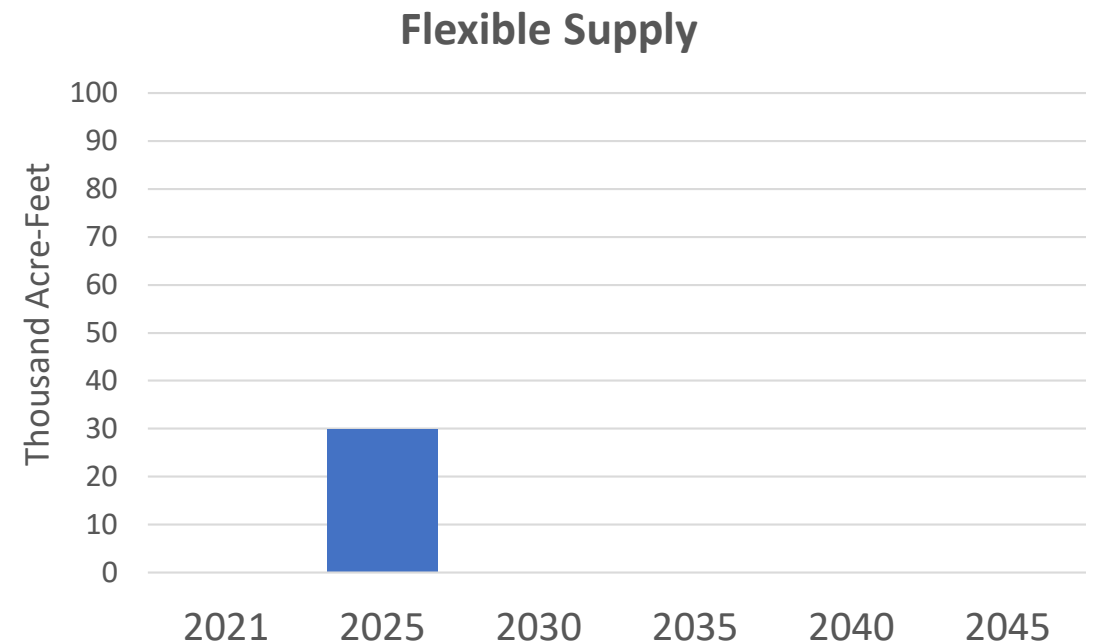
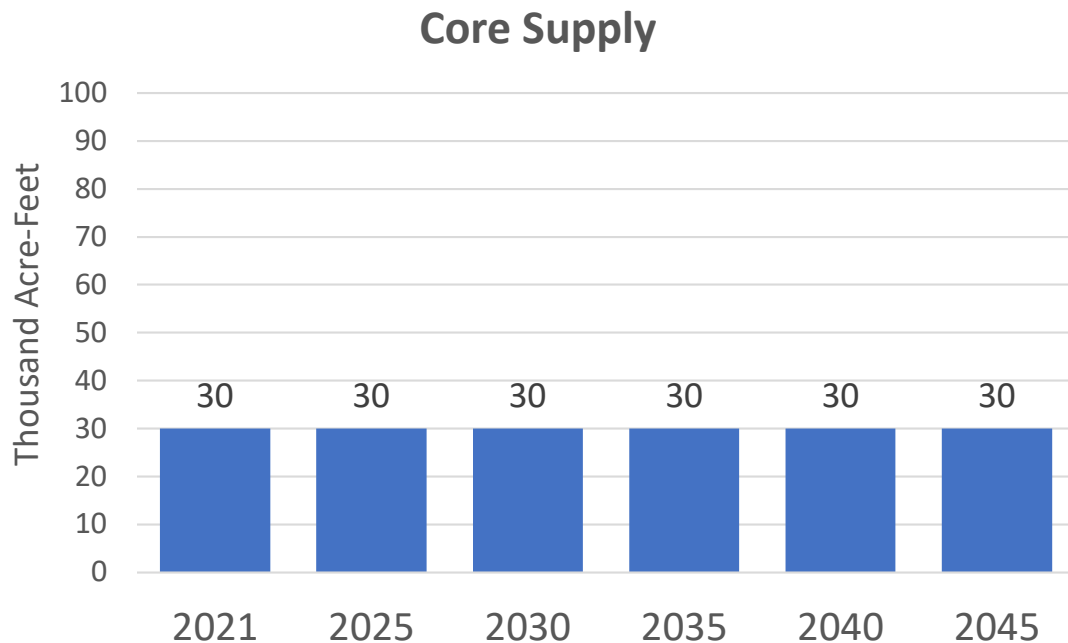
Mix of Portfolio Categories



Storage: 250,000 AF with 125,000 AFY put/take capacity

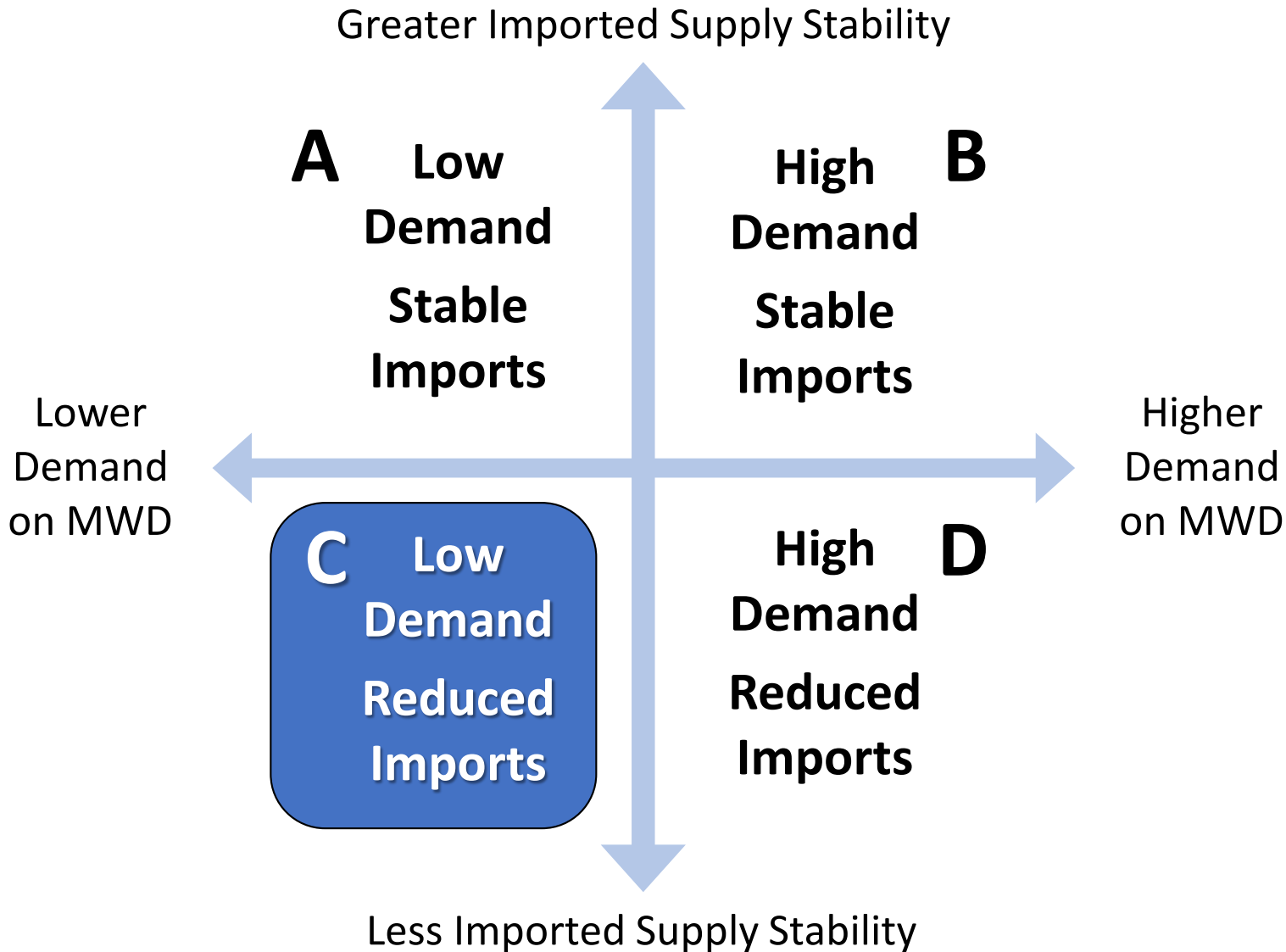
SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories



Storage: 500,000 AF with 250,000 AFY put/take capacity

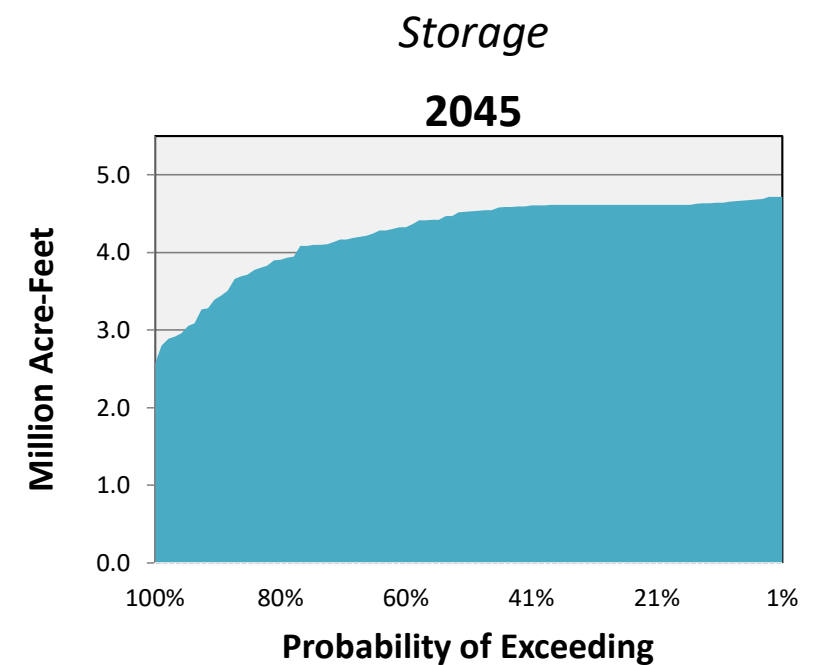
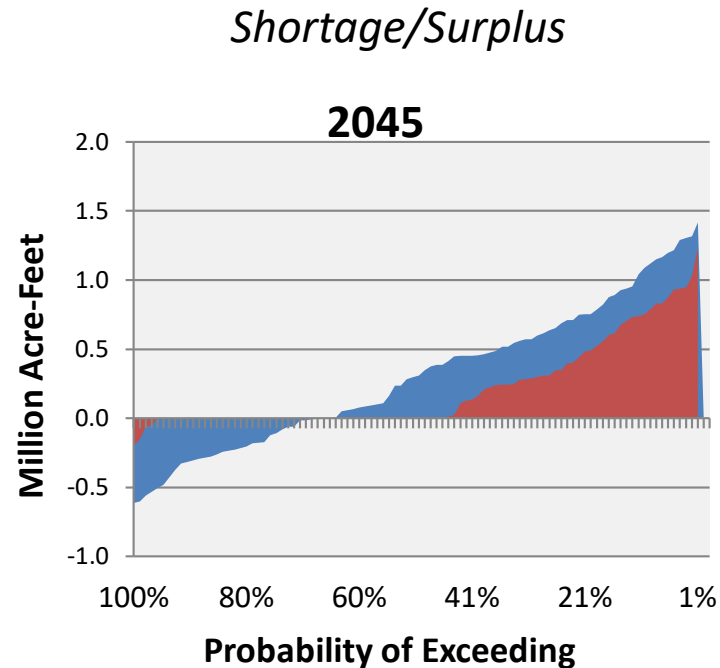
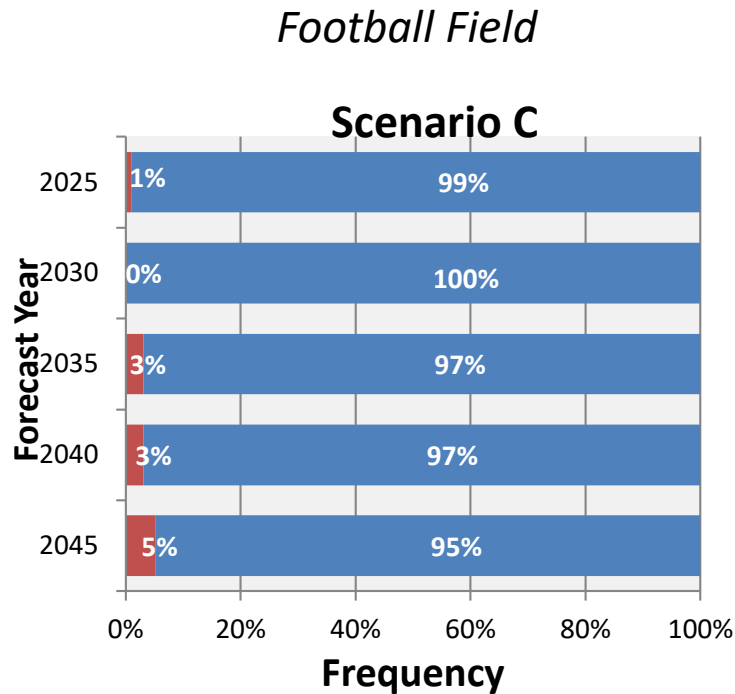
SCENARIO C



Scenario C

This scenario combines **modest population and economic growth** with successful efforts among local agencies to **manage water use behavior**. Rapid onset of **climate change effects and regulatory constraints** impact imported supplies and local supplies.

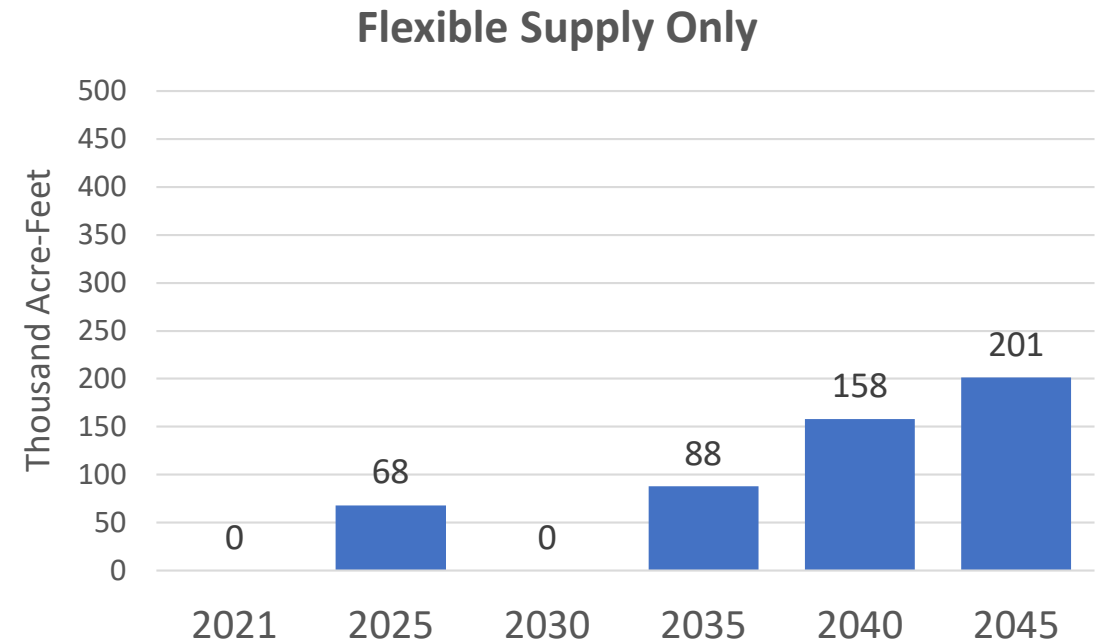
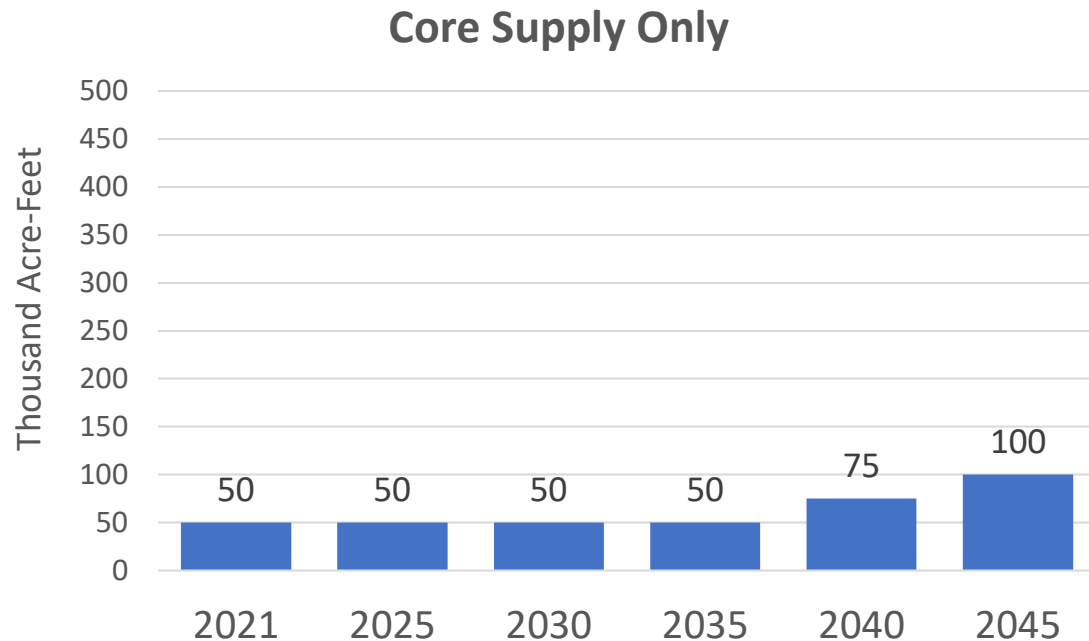
SCENARIO C – GAP ANALYSIS FINDINGS



- Shortages occur between 1-5% of the time through planning horizon
- Up to 200 TAF of shortage in 2045
- End of year storage is above 4.5 MAF 52% of the time by 2045

SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

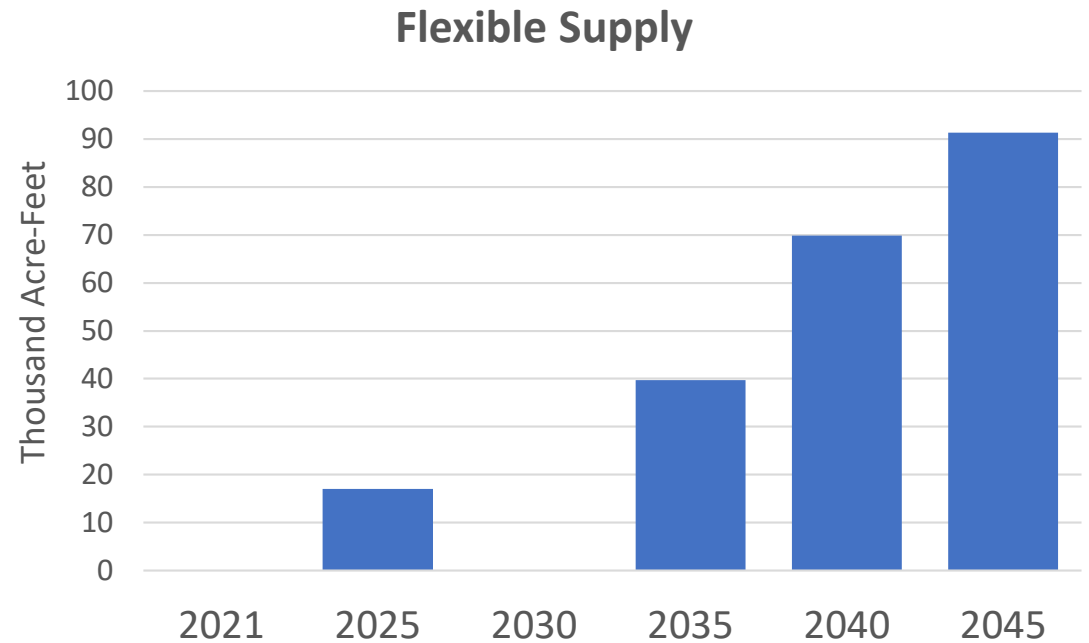
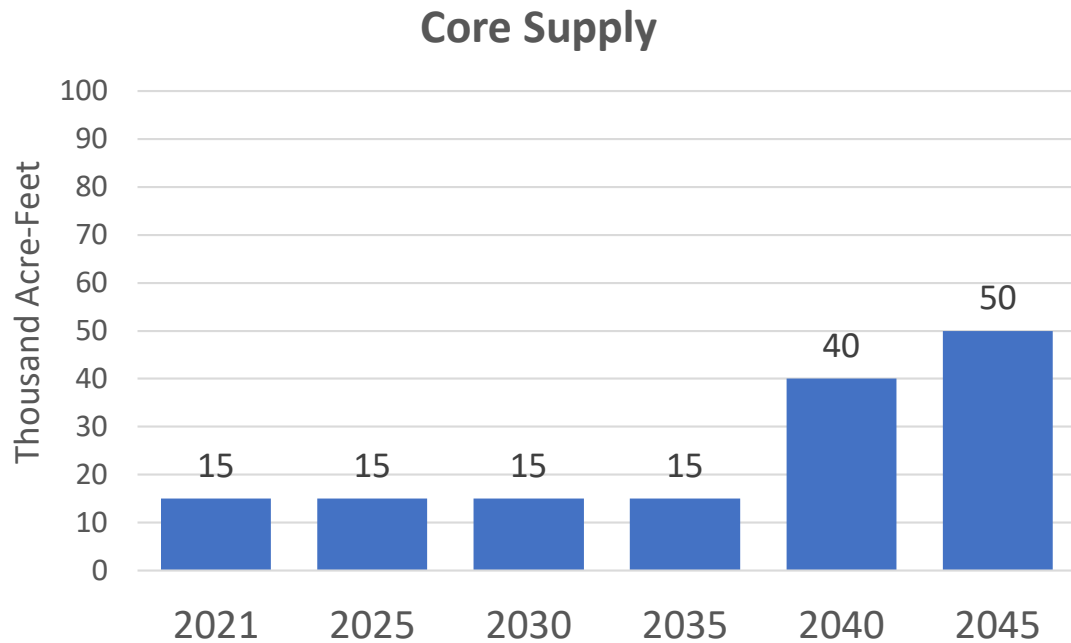
Each Portfolio Category in Isolation



Storage Only: An additional SWP 500,000 AF of storage capacity with a 250,000 AFY put/take capacity will eliminate shortage

SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

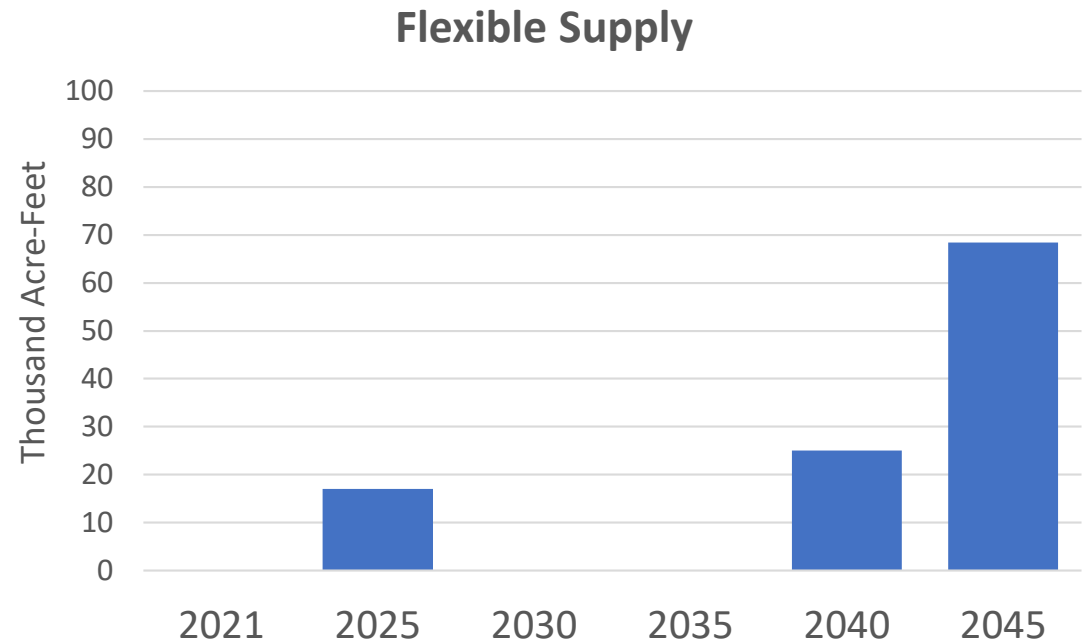
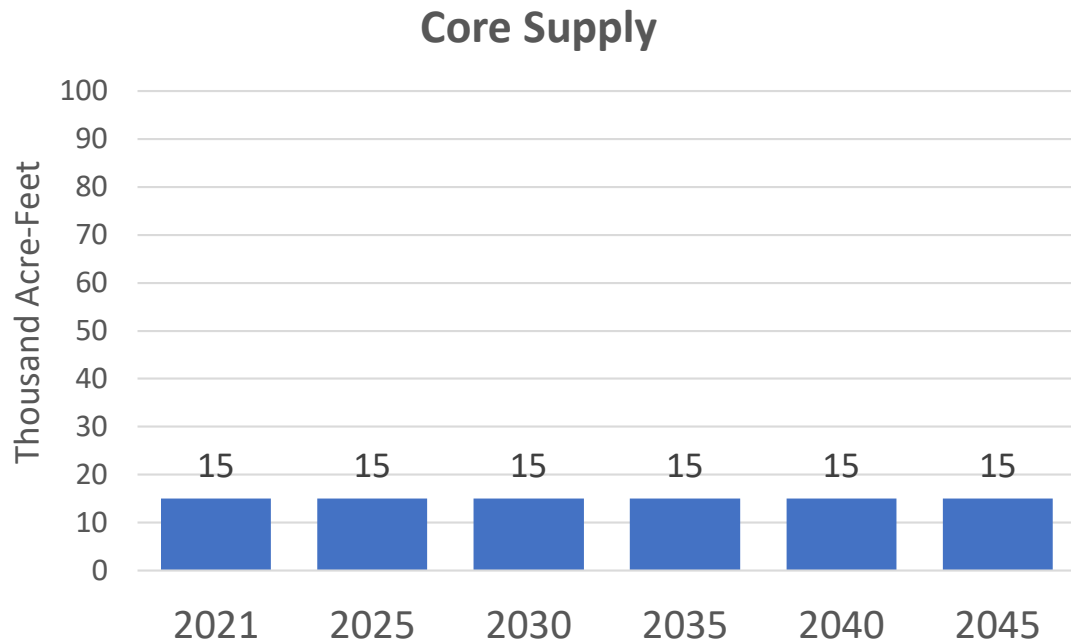
Mix of Portfolio Categories



Storage: No Additional Storage

SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

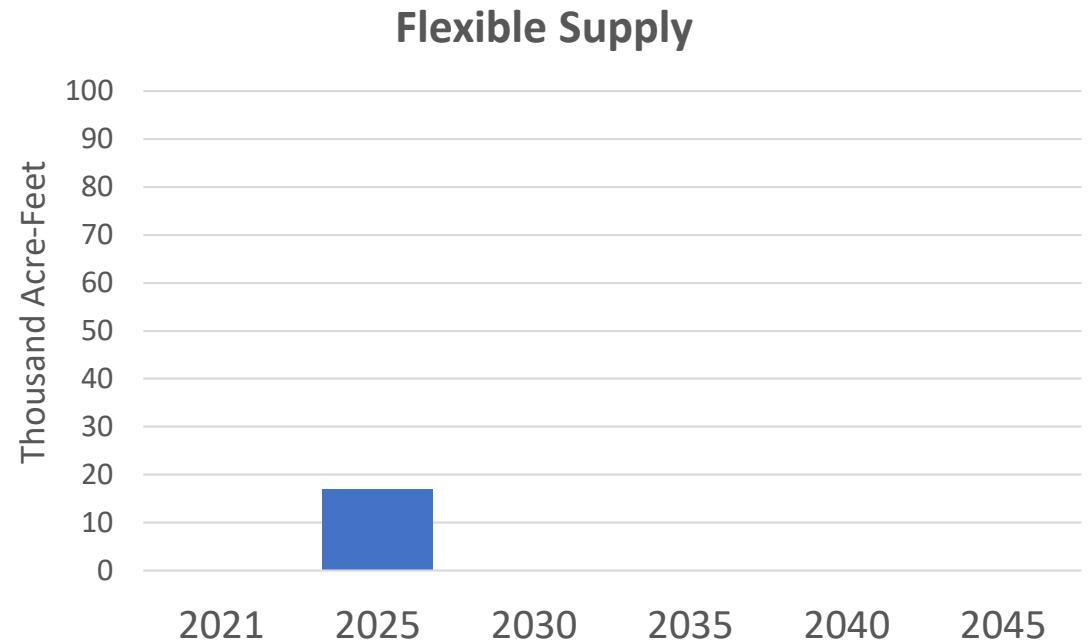
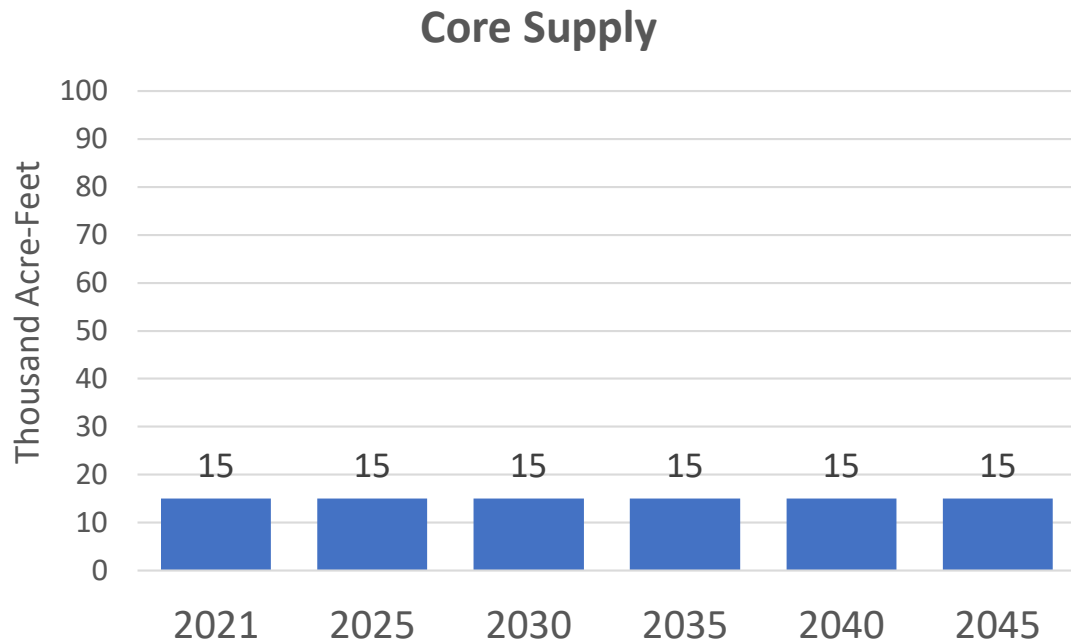
Mix of Portfolio Categories



Storage: 100,000 AF with 50,000 AFY put/take capacity

SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

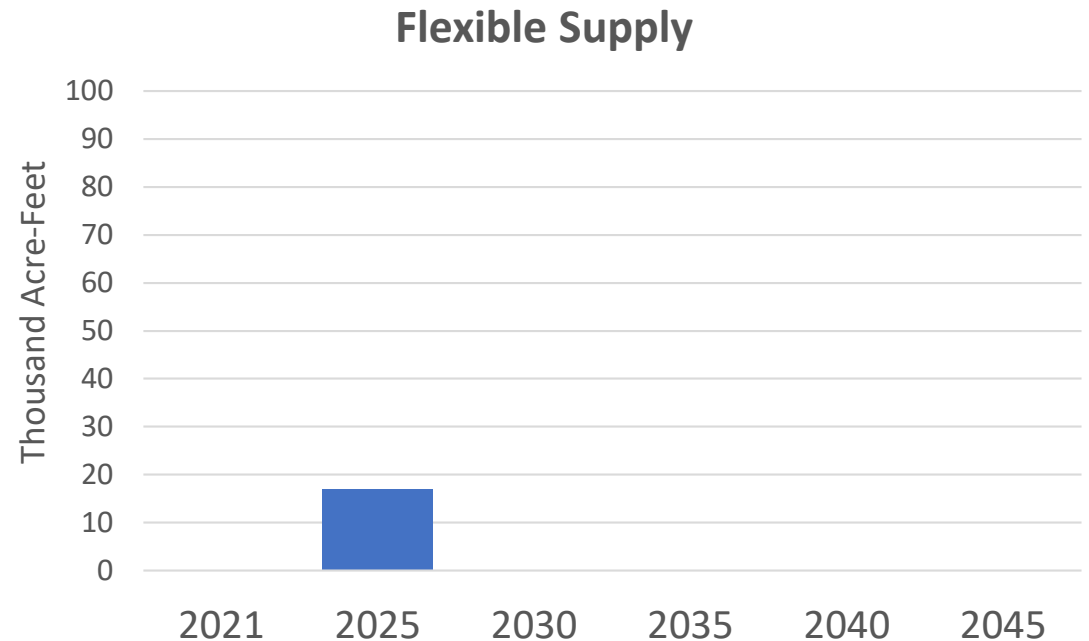
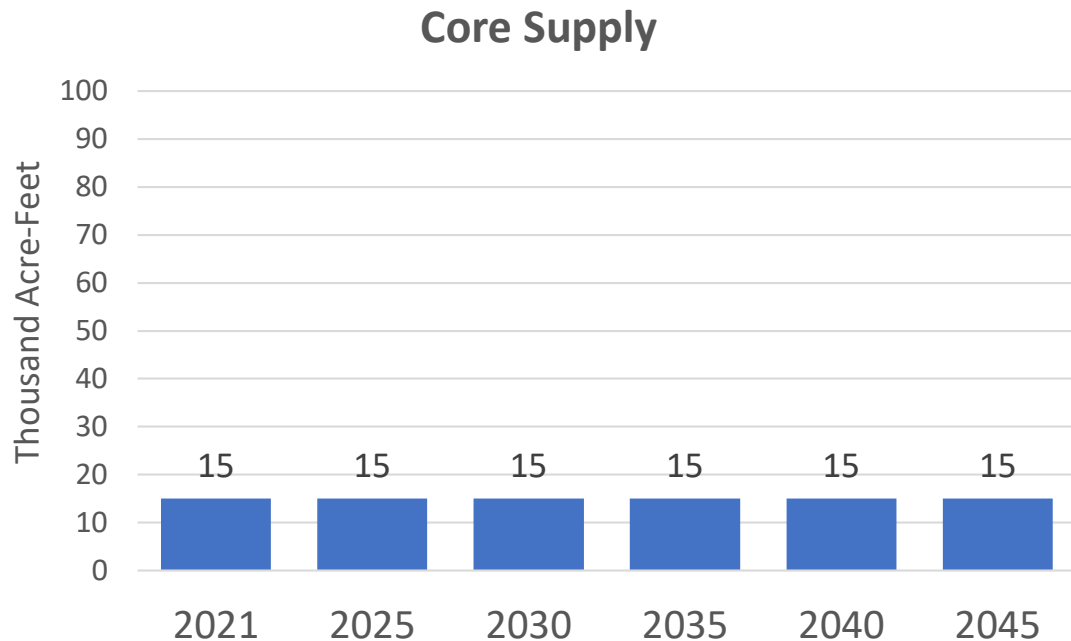
Mix of Portfolio Categories



Storage: 250,000 AF with 125,000 AFY put/take capacity

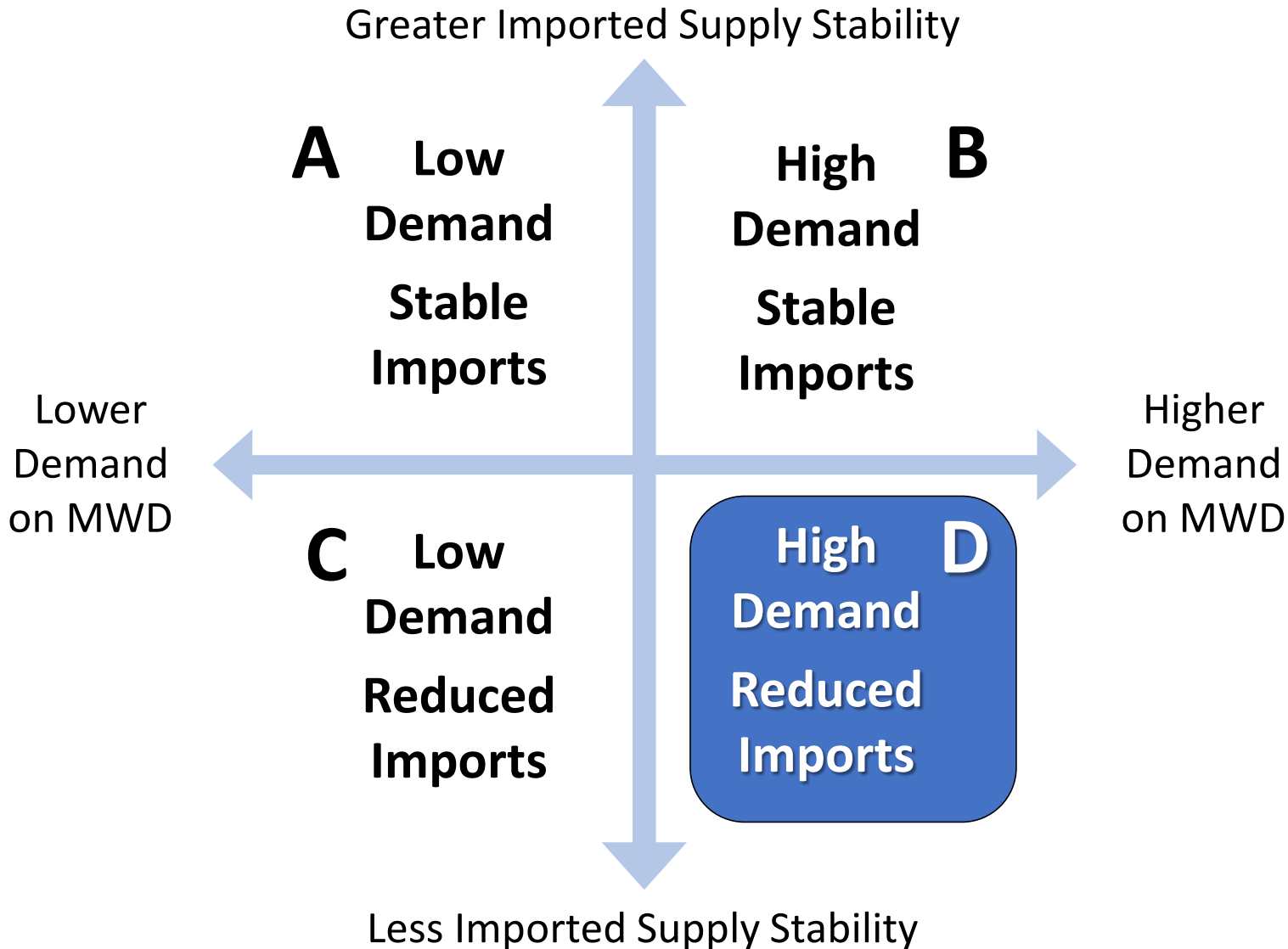
SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories



Storage: 500,000 AF with 250,000 AFY put/take capacity

SCENARIO D

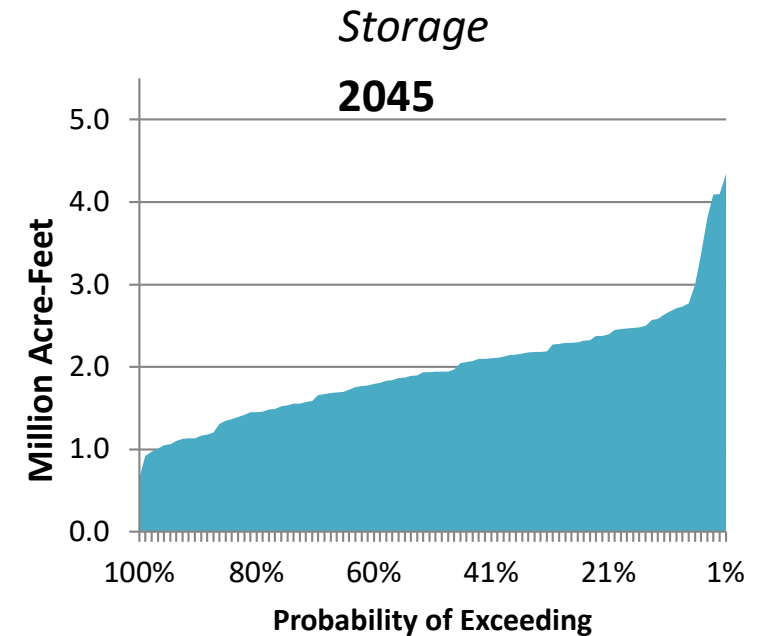
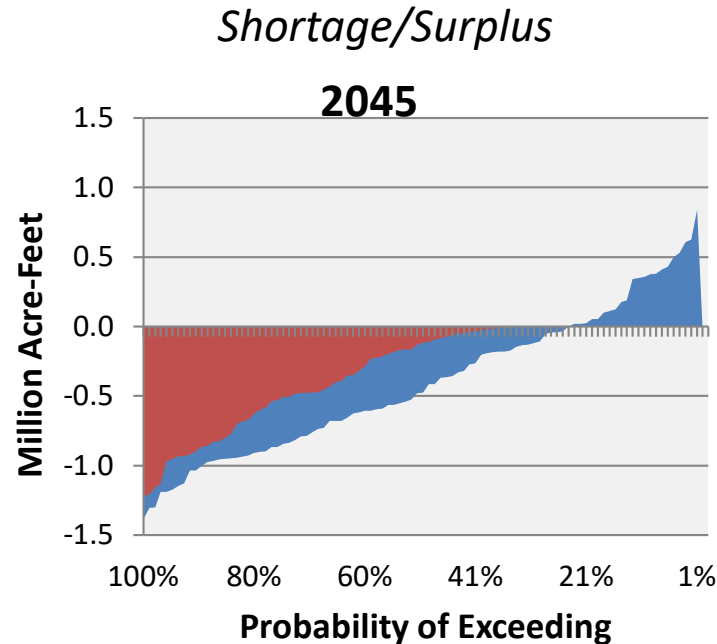
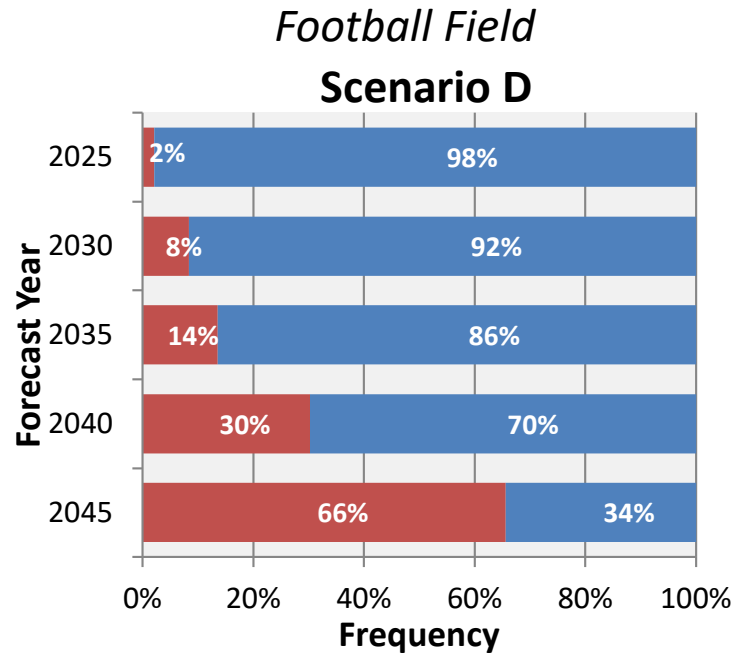


Scenario D

This highly-challenging scenario is beset by higher demands, unstable imported and diminishing local supplies. **Drivers of change on both demand and supply-side conspire to present serious threats to water reliability.** High retail demands reflect strong economic and demographic growth and a rebound of water-using behaviors. Severe climate change and regulatory constraints impact both imported and local supplies.

Most challenging overall reliability outlook of the four IRP scenarios

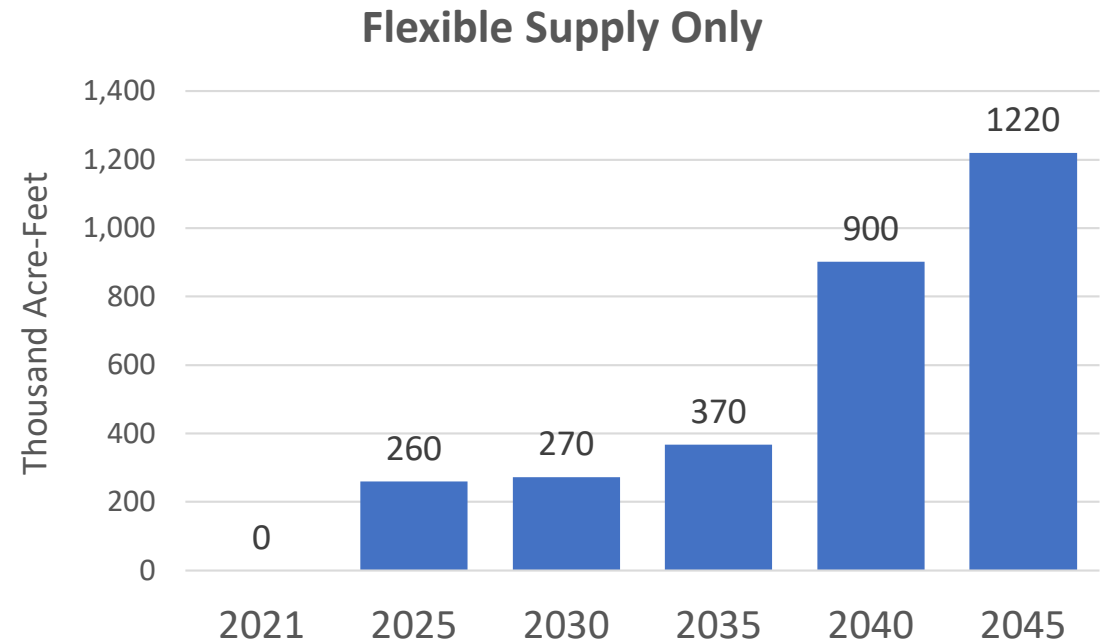
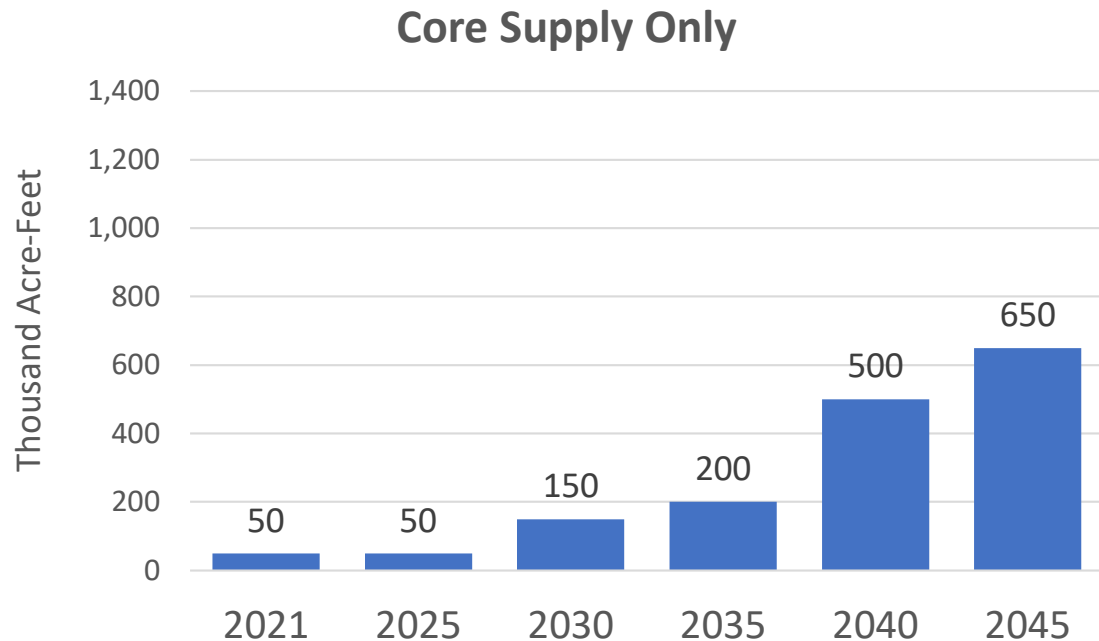
SCENARIO D – GAP ANALYSIS FINDINGS



- Risk of shortage increasing substantially through the planning horizon (2-66%)
- Up to 1.22 MAF of shortage in 2045
- End of year storage is never full in this scenario

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Each Portfolio Category in Isolation

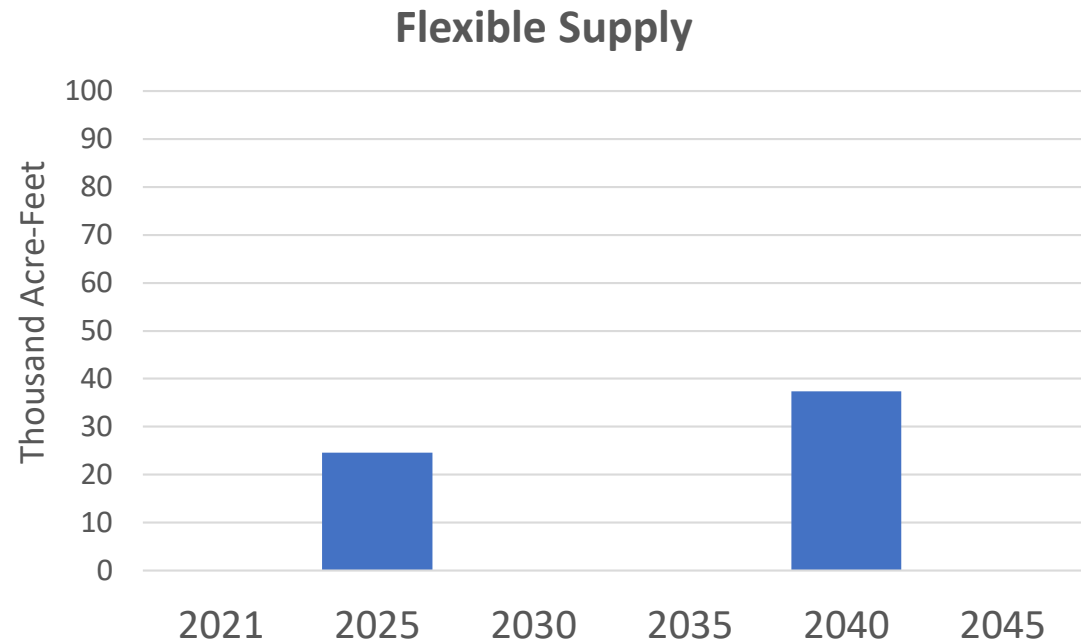
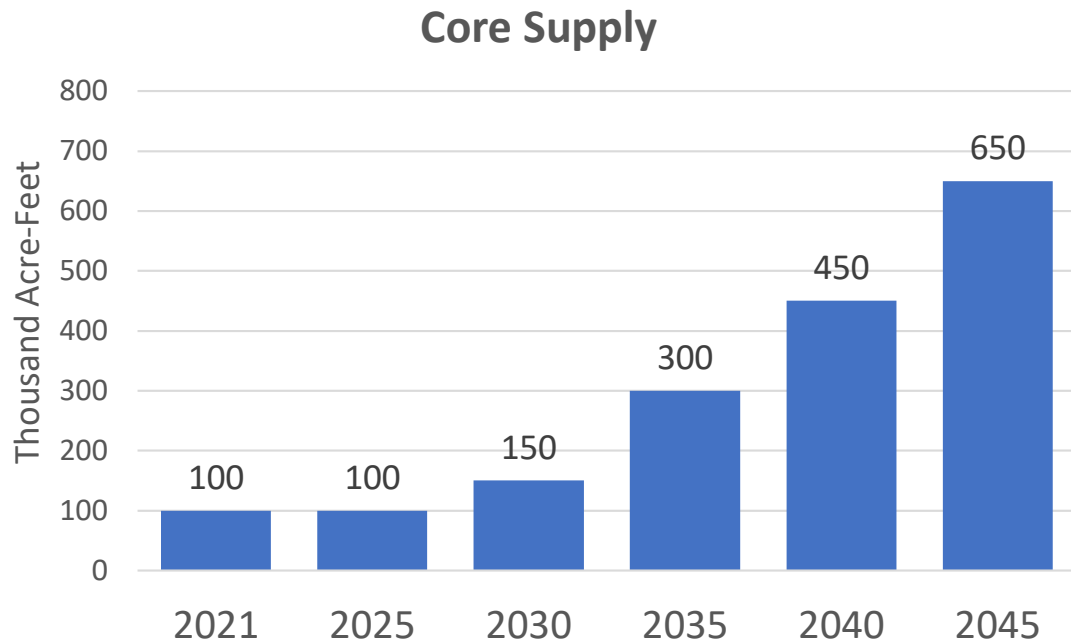


Storage Only: No amount of additional storage capacity will eliminate shortage on its own

Note: Different scale used than Scenarios B and C

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories

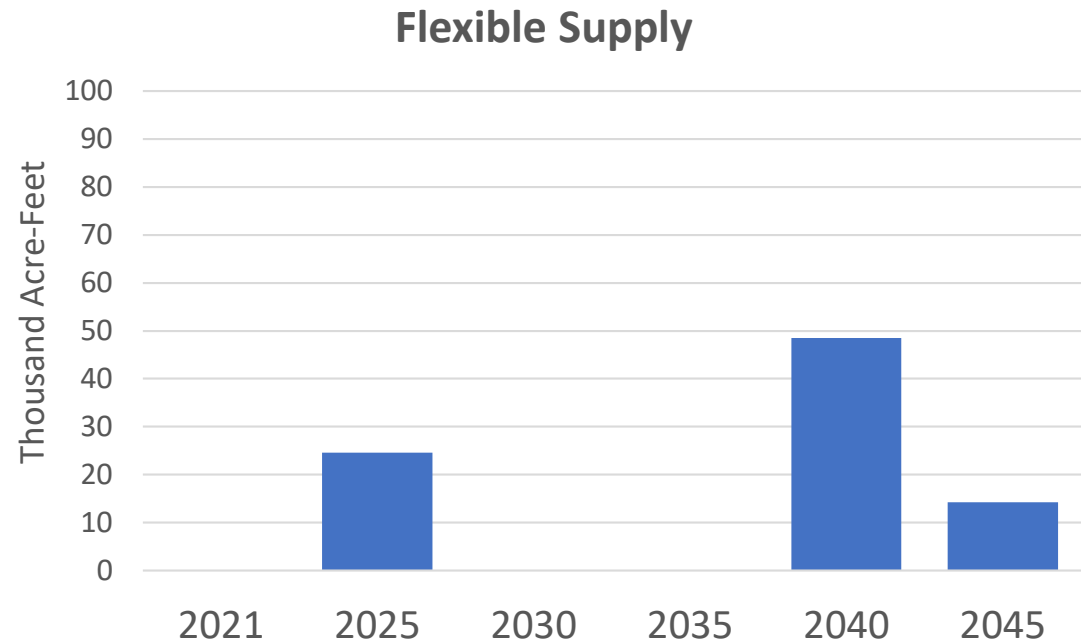
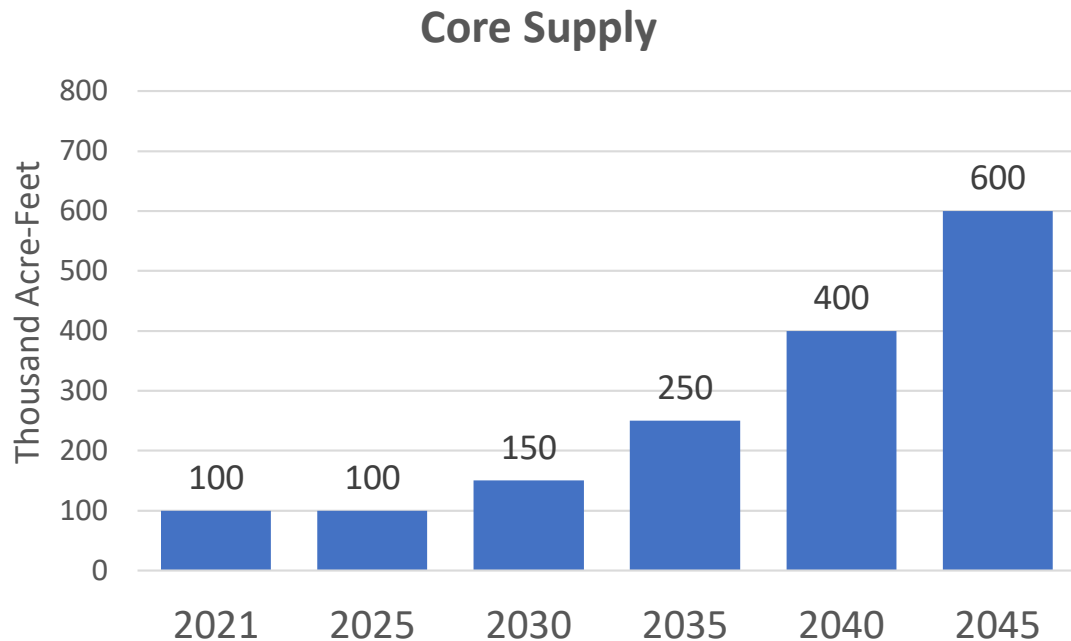


Storage: No Additional Storage

Note: Different scale used than Scenarios B and C

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories

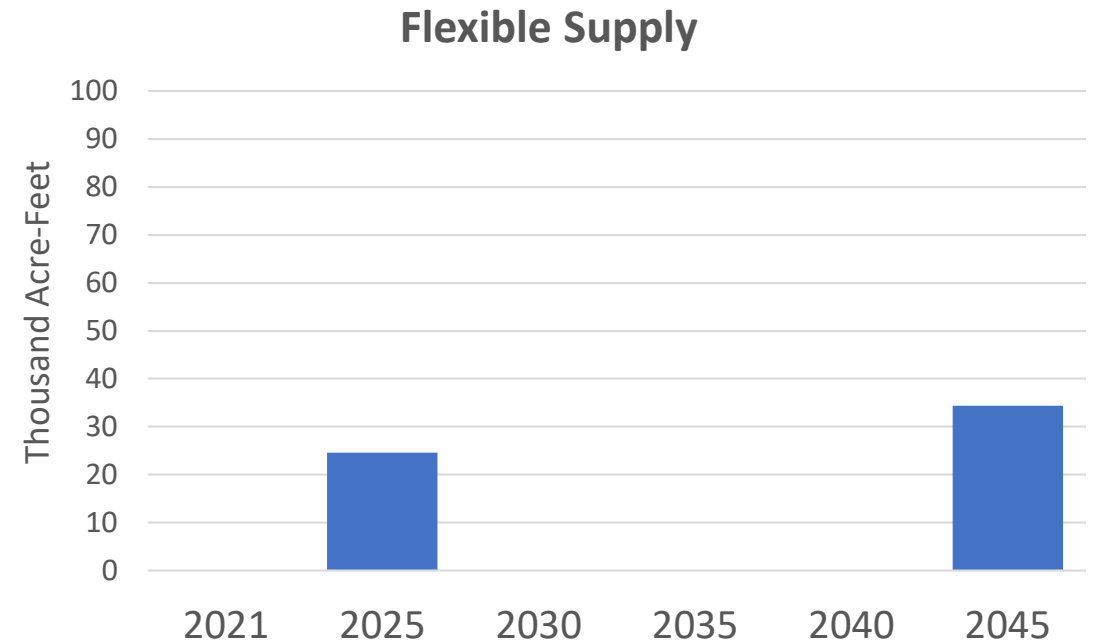
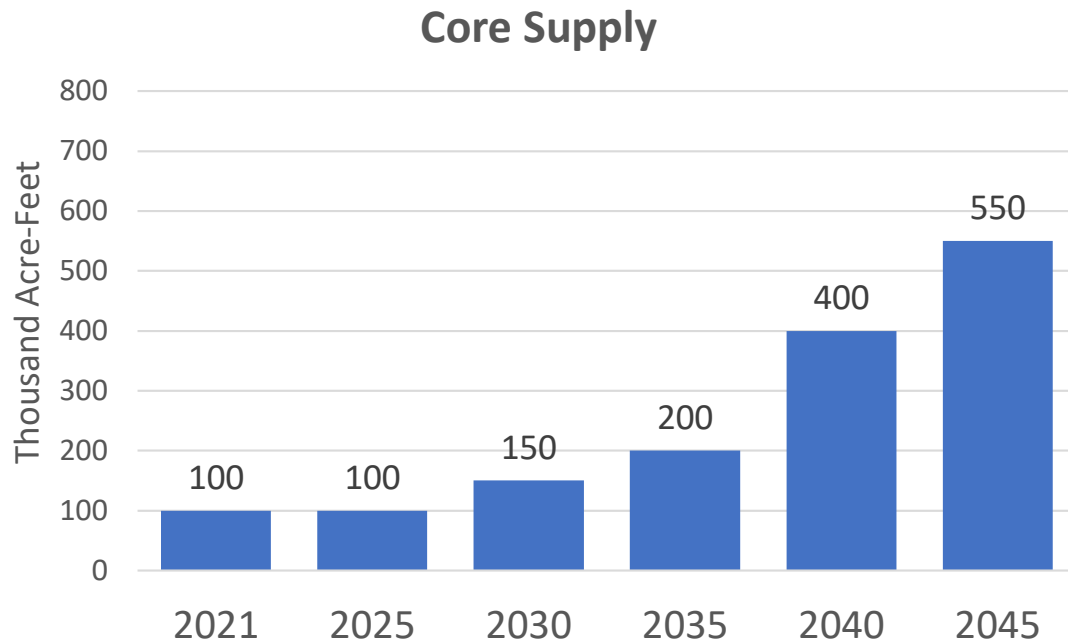


Storage: 100,000 AF with 50,000 AFY put/take capacity

Note: Different scale used than Scenarios B and C

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories

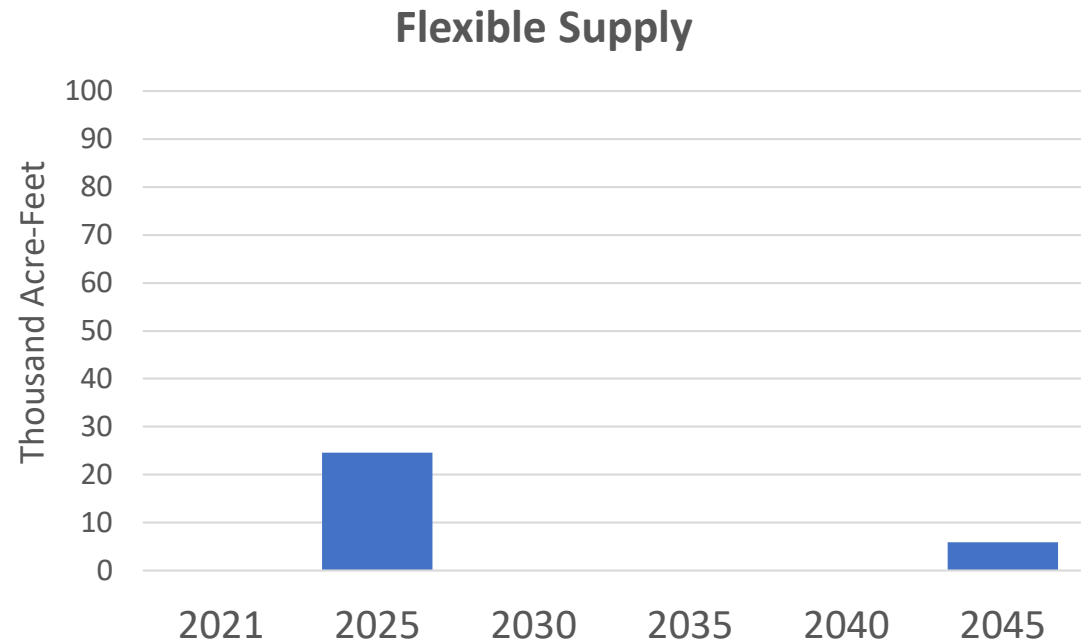
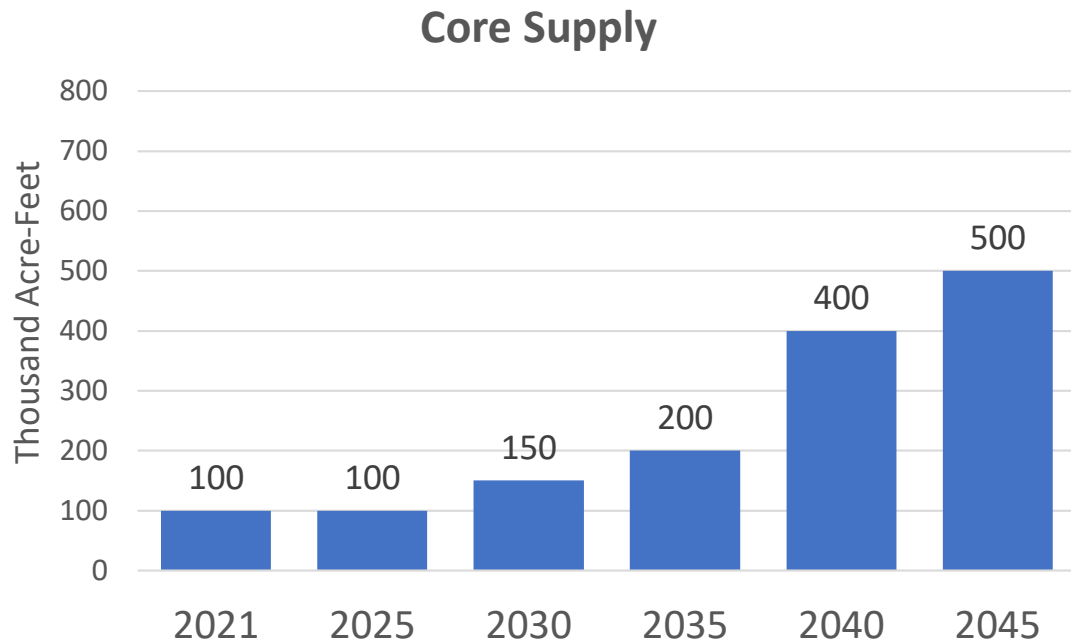


Storage: 250,000 AF with 125,000 AFY put/take capacity

Note: Different scale used than Scenarios B and C

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories

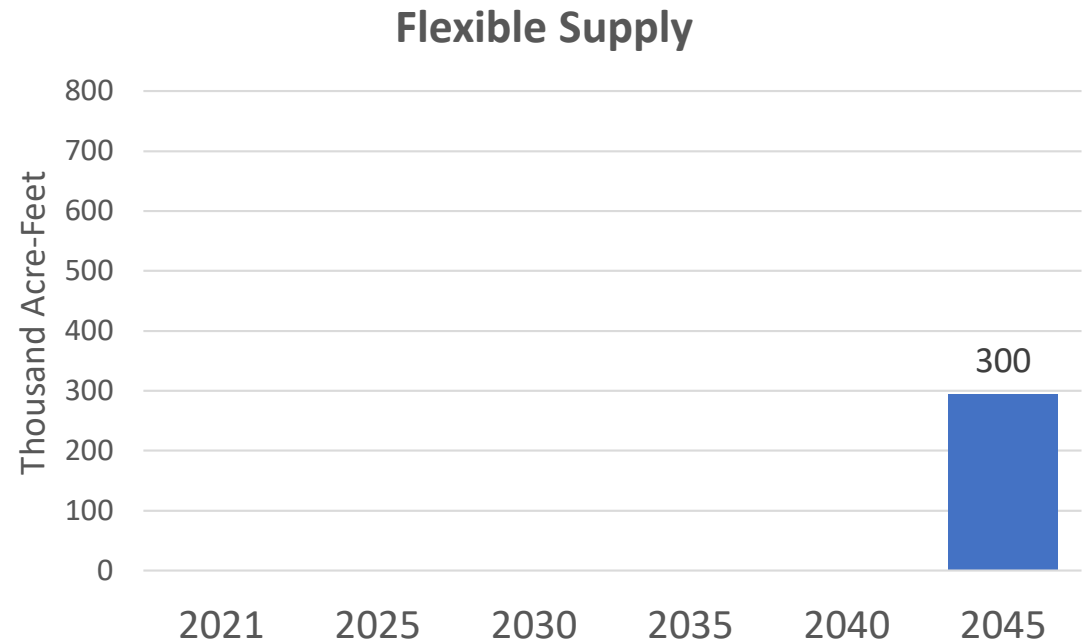
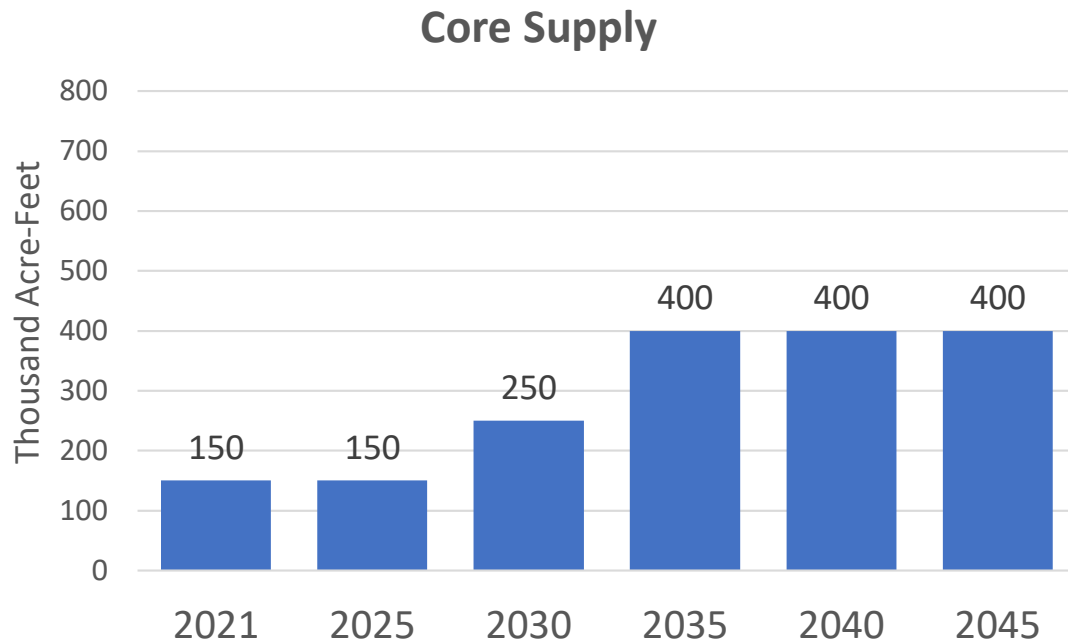


Storage: 500,000 AF with 250,000 AFY put/take capacity

Note: Different scale used than Scenarios B and C

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Mix of Portfolio Categories



Storage: Addition of 1 MAF of SWP storage with 500 TAFY put/take capacity

Note: Different scale used than Scenarios B and C

SCENARIO B – PORTFOLIO CATEGORY ANALYSIS

Takeaways

- Challenges are due mostly to increasing demands
- A combination of Core, Flexible and Storage will optimize how we eliminate shortages
- All shortages experienced in “SWP Dependent” areas, adding CRA storage will not reduce frequency or magnitude of shortage

Scenario B		
Modeled Storage	Flex Supply Target	Core Supply Needed by 2045
0 TAF	100 TAF	100 TAF
100 TAF		70 TAF
250 TAF		30 TAF
500 TAF		30 TAF

SCENARIO C – PORTFOLIO CATEGORY ANALYSIS

Takeaways

- Challenges are mostly due to decreasing local and imported supplies
- A combination of Core, Flexible and Storage will optimize how we eliminate shortages
- All shortages experienced in “SWP Dependent” areas, adding CRA Storage will not reduce frequency or magnitude of shortage

Scenario C		
Modeled Storage	Flex Supply Target	Core Supply Needed by 2045
0 TAF	100 TAF	50 TAF
100 TAF		15 TAF
250 TAF		15 TAF
500 TAF		15 TAF

SCENARIO D – PORTFOLIO CATEGORY ANALYSIS

Takeaways

- Challenges are due to both increasing demands and decreasing local and imported supplies
- Additions to Core Supply and Storage work together in tandem
- Shortages affect Metropolitan’s “blended” areas in the out-years, not just attributed to the “SWP Dependent” areas

Scenario D		
Modeled Storage	Flex Supply Target	Core Supply Needed by 2045
0 TAF	100 TAF	650 TAF
100 TAF		600 TAF
250 TAF		550 TAF
500 TAF		500 TAF

KEY FINDINGS

KEY FINDINGS FOR BOARD APPROVAL

Reliability

- Avoid end user mandatory cutbacks

Implementation Phase

- Specific actions must support the core supply and new storage capacities identified in the IRP Needs Assessment Phase

SWP Dependent Areas

- Vulnerabilities in the SWP Dependent areas are more severe given reduced reliability of SWP supplies
- New core supplies and/or storage must reach SWP Dependent areas

Storage

- Preserving existing storage portfolio is vital in maintaining reliability under current conditions
- Expanding existing or developing new storage programs helps balance new core supply development that is needed to meet potential future shortages

KEY FINDINGS FOR BOARD APPROVAL (CONT.)

Demand Management

- MWD's future reliability is highly susceptible to increases in demands
- Managing demands through water use efficiency practices reduces dependency on flexible supplies and helps preserve storage

Imported Supplies

- Existing imported supplies are at risk from various drivers of uncertainty
- Maintaining existing imported supply reliability reduces the need for new core supply development and leverages years of investments and future commitments
- Imported supplies provides water for storage in wet years, for use in dry years

Local Supply

- Maintaining existing and developing new local supplies is critical in managing demands on MWD and in reducing the dependency on imported supplies
- Impacts to reliability are greater if local supply assumptions are not achieved
- Intervention is needed should existing and future local supply levels deviate from IRP assumptions

KEY FINDINGS FOR BOARD APPROVAL (CONT.)

Adaptive Management

- There are a wide range of uncertainties impacting reliability
- Reporting and analysis of monitoring/signposting data is important
- Collaborative process with public stakeholders, member agencies, expert consultants has resulted in areas of signposts to monitor:
 - Demographic growth
 - Local supply – New development and existing projects
 - Water-use ethic
 - GHG emissions
 - CRA – Negotiations
 - SWP – Regulatory processes (Voluntary Agreements)
 - Status of storage agreements
 - Water quality
- Adaptive management strategy should include information from these signposts of key drivers

NEXT STEPS

NEXT STEPS

- Obtain feedback on IRP Findings
- Seek Board approval of Key Findings in November 2021
- Transition to a collaborative process with member agencies and stakeholders focused on implementation and adaptive management
 - Specific actions (elements and sub-elements) would be consistent with portfolio category analysis and require deliberation on policy options and tradeoffs

Based on Workgroup discussion, We will not seek approval from Board on Findings in November. We will continue to work with the Member Agencies to finalize the Findings

