Long Range Water Reliability Plan

Board Workshop

October 29, 2014

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Presentation Overview

- Review LRWRP Goal and Objectives
- Review Gap Analysis
- Present Evaluation Findings
- Present Draft Recommendations

LRWRP Goals & Objectives

LRWRP Goal

- Develop a long-term strategy for improving both system and water supply reliability under various outage scenarios
- Strategy will be adaptive in nature, reflecting uncertainties in the future

LRWRP Objectives

Objective	Relative Weight
• Water Reliability	25%
• Cost-Effectiveness	25%
• Implementation Ease	20%
• Operational Ease	10%
• Finished Water Quality*	10%
• Environmental Aspects*	10%

* All federal and state regulatory requirements will be met, these objectives are above and beyond legal requirements.

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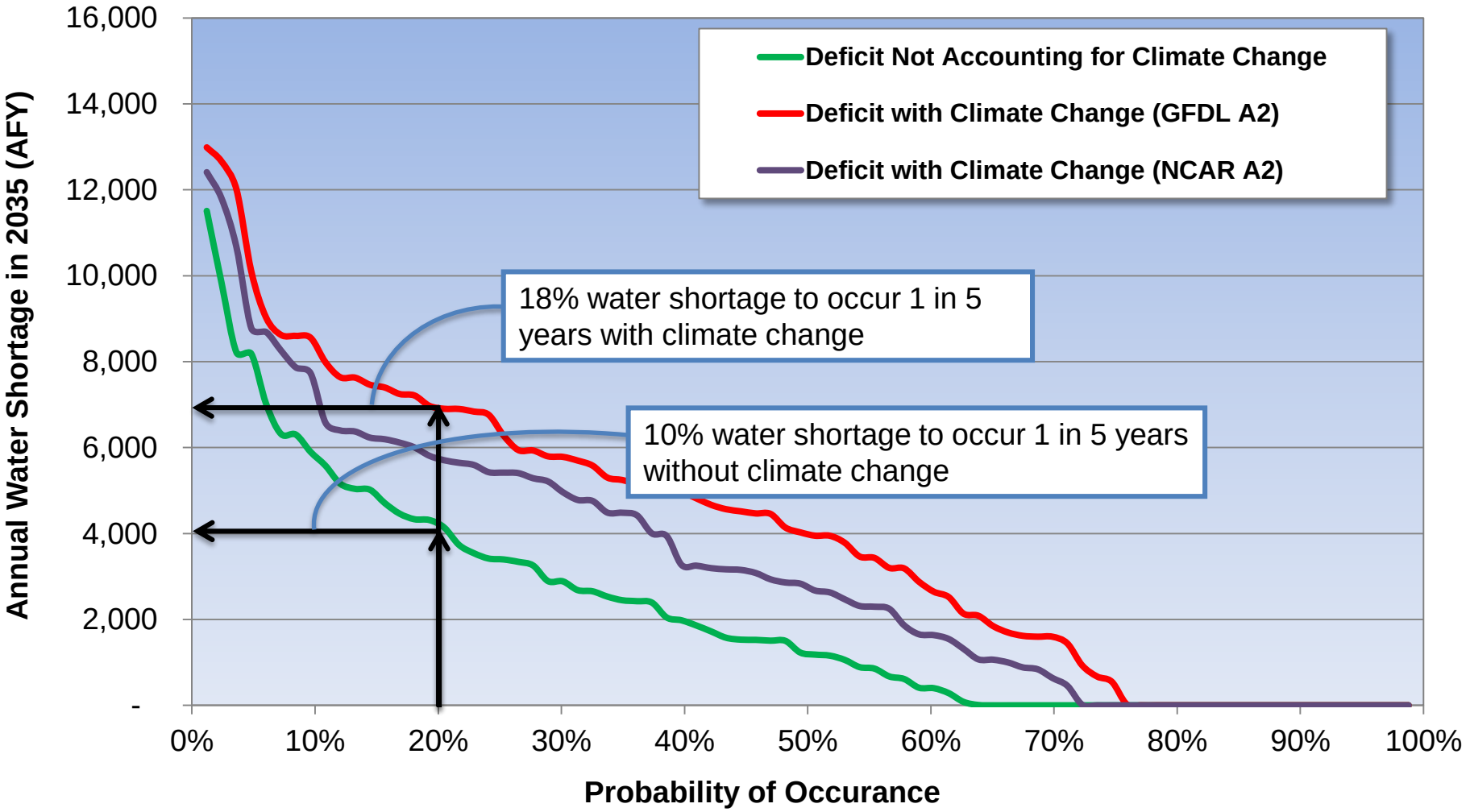
Review Gap Analysis

Water Shortages without BDCP in 2035



Source: CDM Smith analysis of State Water Project and MWD Reliability

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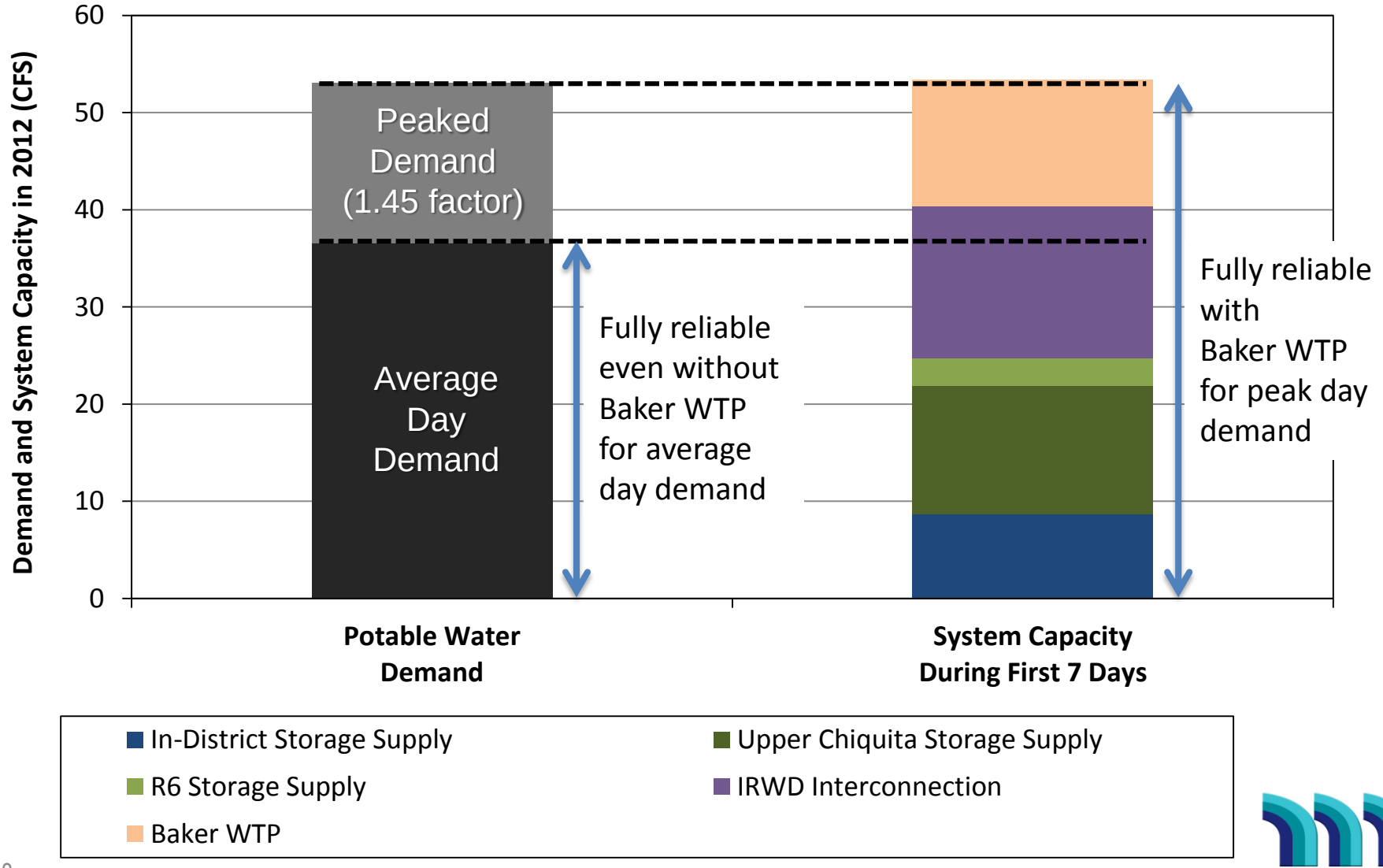
Current System Reliability: Complete Imported Water Shut-Down



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Summary of Significant Seismic Risk

Delta Levee Risk

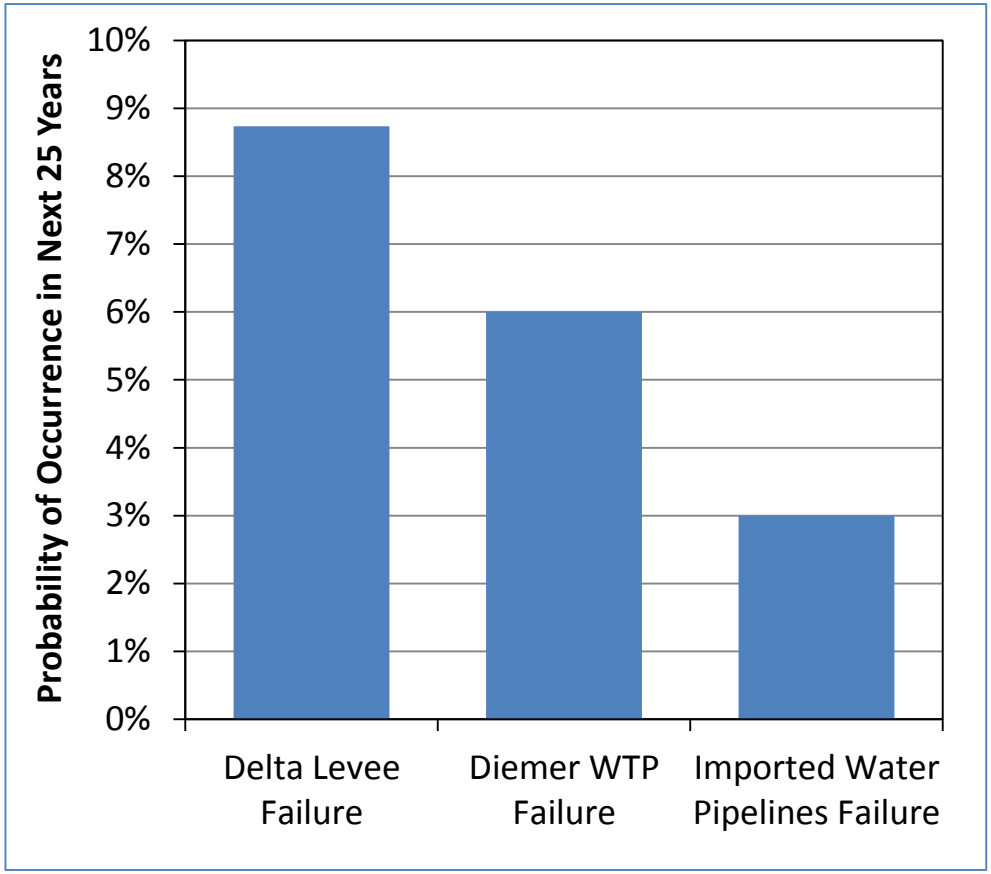
- The risk of SWP supplies being totally disrupted for up to two years

Diemer WTP

- The risk of a complete shut-down of plant for 30-60 days

Imported Water Pipelines

- The risk of both regional treated water pipelines breaking for 10 days



Source: California DWR and CDM Smith's use of EZ-FRISK earthquake ground motion software

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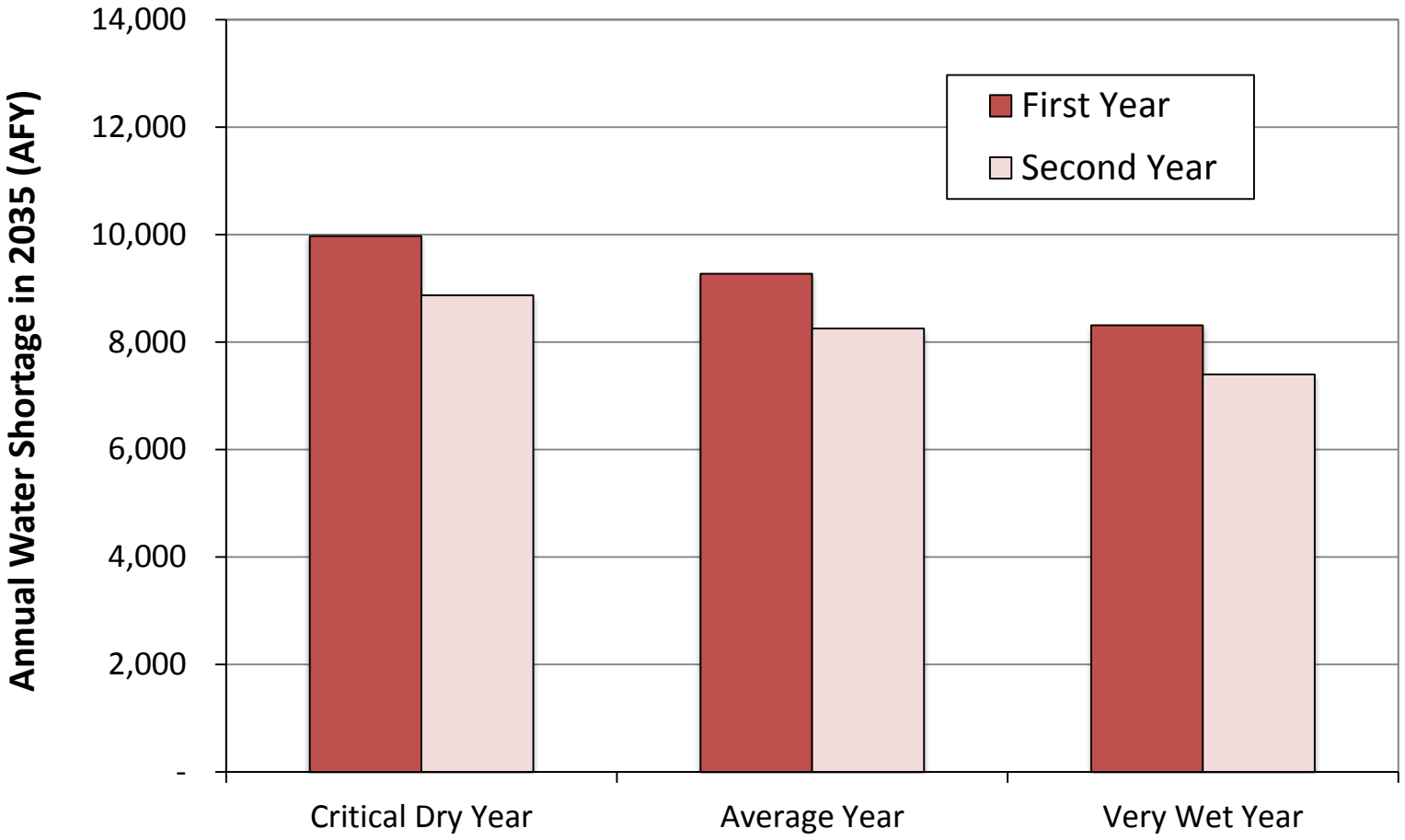
Delta Levee Failure Impact



Based on California DWR Report: Delta Risk Management Strategy (2009)

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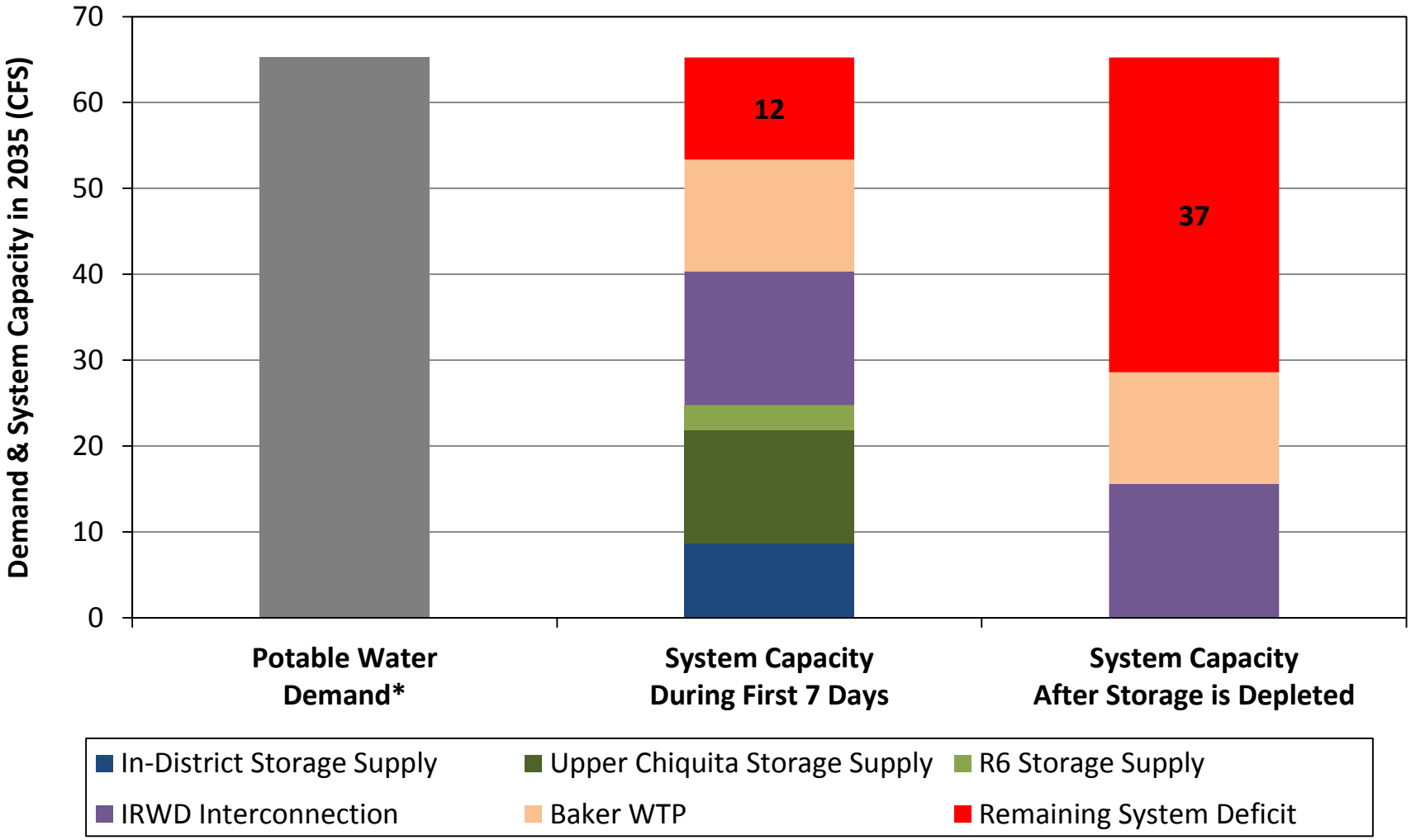
Future System Reliability in 2035: Diemer WTP Failure



** Full service demand without mandatory restrictions (emergency conservation)*

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Evaluation Results

Reliability Scenarios

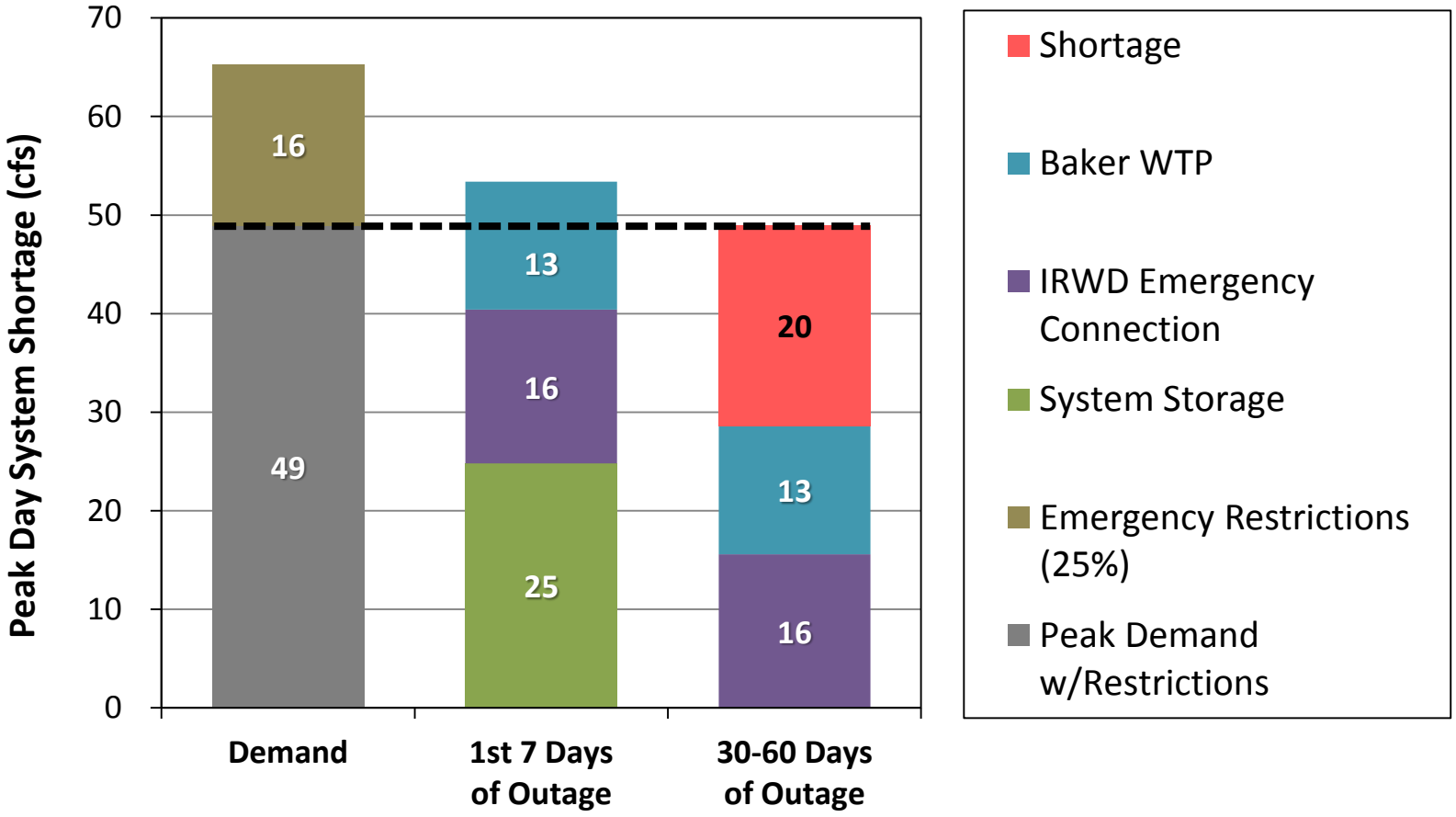
Shortage Levels for Delta Scenarios

Shortage Type	No BDCP Without Climate Change	No BDCP With Moderate Climate Change	BDCP Without Climate Change	BDCP With Moderate Climate Change
System Shortage from Diemer WTP Outage	**Significant**	**Significant**	**Significant**	**Significant**
Supply Shortage from Droughts	**Moderate**	**Significant**	**None**	**Minor**
Supply Shortage from Delta Levee Failure	**Significant**	**Significant**	**None**	**None**

Emergency Water Restrictions

Shortage Type	No BDCP Without Climate Change	No BDCP With Moderate Climate Change	BDCP Without Climate Change	BDCP With Moderate Climate Change
System Shortage from Diemer WTP Outage	**25%**	**25%**	**25%**	**25%**
Supply Shortage from Droughts	**20%**	**20%**	**None**	**10%**
Supply Shortage from Delta Levee Failure	**20%**	**20%**	**None**	**None**

Revised System Gap in 2035



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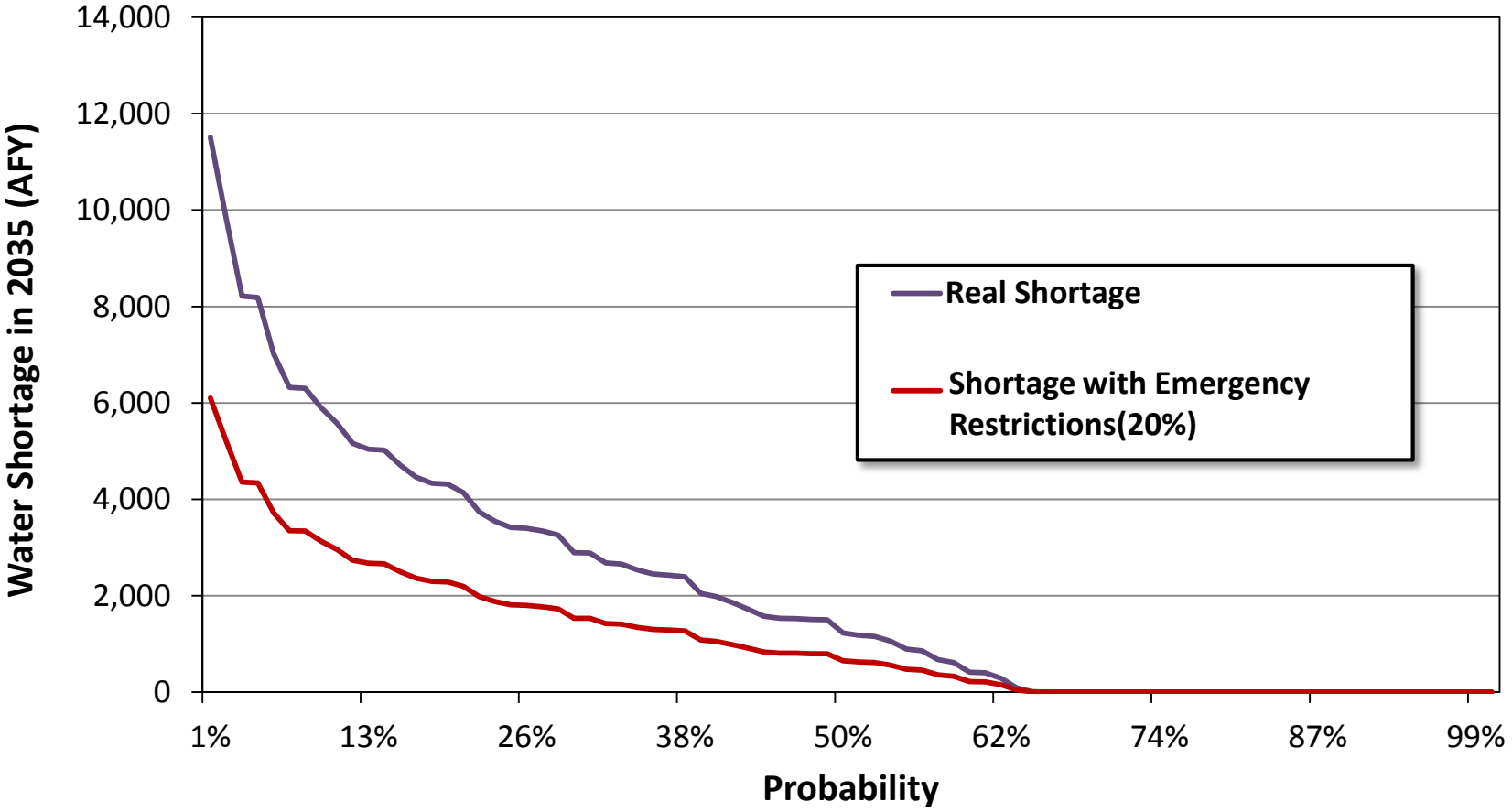
Revised Supply Gap in Drought in 2035



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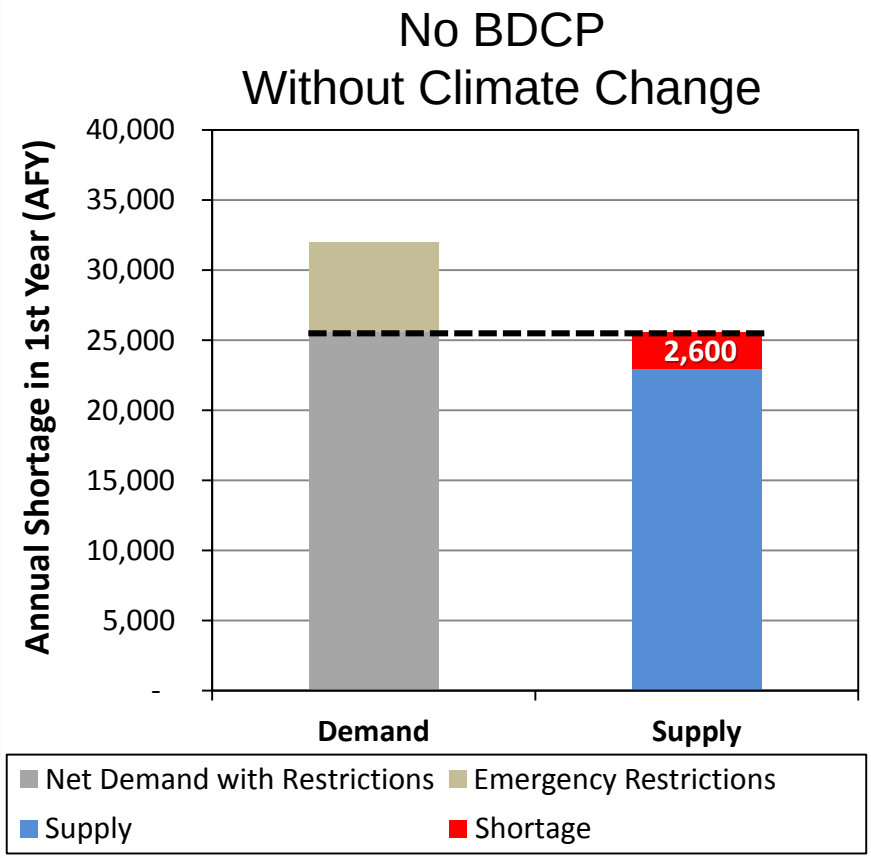
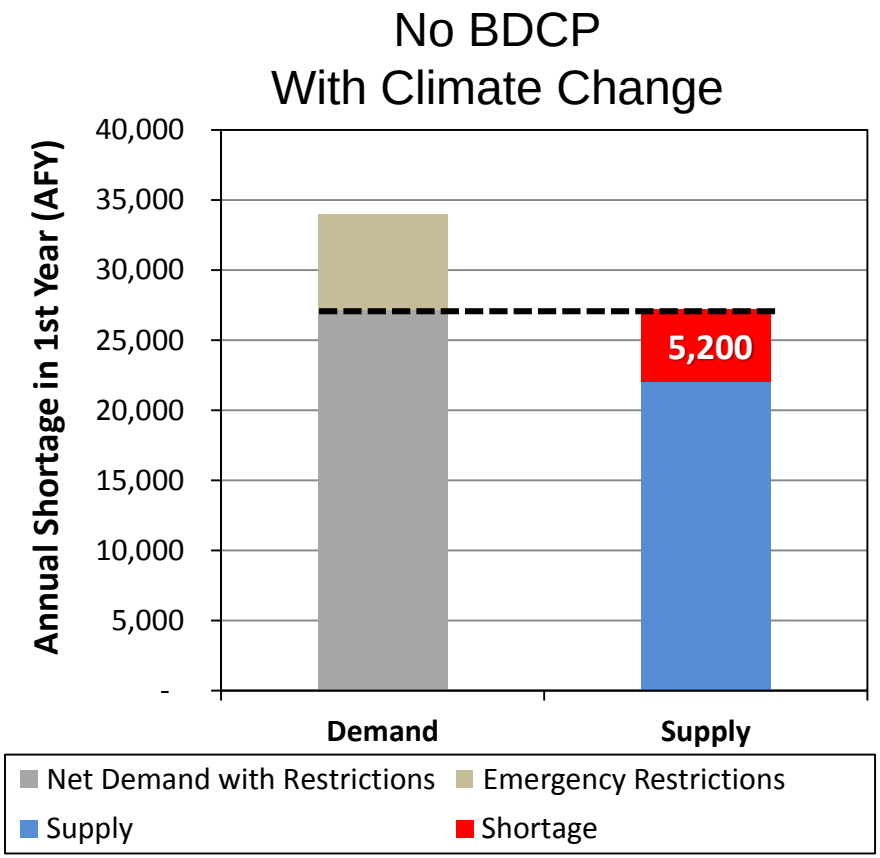
Revised Supply Gap Under Delta Levee Failure in 2035





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Economic Costs of Shortages in 2035

Any shortage (system or supply) that exceed revised gaps will cause MNWD's service area economic harm. Estimates of economic costs are based on 2004 MWDOC study—but these costs were adjusted downward to reflect MNWD's service area makeup. **Costs reflect probability of shortage.**

- For every 5 cfs of system shortage (beyond 25% emergency restrictions) = **$1.2 million** in economic cost
- For every 100 AFY of supply shortage (beyond 20% emergency restriction) = **$10,000** in economic cost
- For every 3,000 AFY of supply shortage (beyond 20% emergency restriction) = **$50 million** in economic cost

Supply Option Conceptualization

- Over a dozen water supply projects, representing various levels of implementation or study, were summarized.
- Six water supply options were conceptualized for MNWD's LRWRP.
- These conceptual options are not to be interpreted as MNWD's assessment of actual supply projects that are being studied for implementation by other OC water agencies. Rather the concepts represent MNWD's perspectives based on its specific needs.

Supply Option 1: Non-potable Reuse Expansion

Expand non-potable reuse in MNWD's service area. **Supply is base loaded**. **Annual Yield = 600 AFY** **Peak Capacity = 1 cfs for 30-60 days**	**Today's Unit Cost ($/AF): $800-$1,200** Costs include new purple pipelines, pump stations and diurnal storage. Unit cost inclusive of MWD LRP.
Delivery and Benefit: Water is delivered within MNWD's service area to meet non-potable water demands. • Provides supply reliability benefits under droughts and Delta Levee failure • Provides system reliability benefits under Diemer WTP outage	**Issues:** • Siting of new diurnal storage • Signing up new customers

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

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Supply Option 2: Expanded Emergency Services Program

MNWD would store imported water in OC Basin to be used for droughts and system emergencies. **Supply is storage water**. **Annual Yield = up to 5,400 AFY** **Peak Capacity = 20 cfs for 30-60 days**	**Today's Unit Cost ($/AF): $950-$1,150** Costs include new GW wells and land purchase (shared with IRWD), purchases of untreated MWD water, pumping costs, and administrative costs to OCWD.
Delivery and Benefit: In partnership with IRWD, all wells would be used by MNWD during system emergencies; and half the well capacity would be used by MNWD during droughts. **No water would be used by MNWD during non-emergencies.** • Provides supply reliability benefits under droughts and Delta levee failure • Provides system reliability benefits under Diemer WTP outage	**Issues:** Policies and project approvals leading to agreement with: • OCWD for storage in the basin and compensation for storage • IRWD for cost-sharing, locating facilities, and use of its facilities to move water • MWD for introduction of GW in imported water pipeline

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

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Supply Option 3: Expanded Groundwater in San Juan Basin

Use of stormwater and tertiary-treated recycled water to expand safe groundwater yield of SJB. **Supply is base loaded**. **Annual Yield = 3,000 AFY** **Peak Capacity = 4 cfs for 30-60 days**	**Today's Unit Cost ($/AF): $1,100-$2,500** Different alternatives that combine various stormwater capture, use of recycled water, expansion of existing GW desalter, and new wells and conveyance. Unit cost inclusive of MWD LRP.
Delivery and Benefit: In partnership with SJB Authority and partners, water would be delivered to southern part of MNWD's service area. • Provides supply reliability benefits under droughts and Delta Levee failure • Provides system reliability benefits under Diemer WTP outage	**Issues:** • Agreement with SJB Authority and partners for cost-sharing • Regulatory approval for using tertiary-treated recycled water for GW recharge • Environmental impacts of additional brine disposal

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

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Supply Option 4: Seawater Desalination

Purchase of seawater desalination water from either (or combination of) Huntington Beach, So. OC, or in San Diego County. **Supply is base loaded**. **Annual Yield = 14,000 AFY** **Peak Capacity = 19 cfs for 30-60 days**	**Today's Unit Cost ($/AF): $1,800-$2,300** Costs include either purchased water agreement costs or shared costs for treatment plant, intake and brine disposal, and conveyance costs. Unit cost inclusive of MWD LRP.
Delivery and Benefit: Desalinated water would be delivered to MNWD's service area via one of several locations. • Provides supply reliability benefits under droughts and Delta Levee failure • Provides system reliability benefits under Diemer WTP outage	**Issues:** • Agreements between partners and/or Poseidon for water • Environmental impacts of intake and brine disposal, and high energy use • Regulatory approvals • Operational challenges for such a high base loaded delivery to MNWD

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

Supply Option 5: Central Valley Water Banking

Use of purchased stored water in existing CV water banks (e.g., Semitropic or IRWD's Strand Ranch) for droughts or Delta levee emergency. **Supply is storage water**. **Annual Yield = up to 1,000 AFY** **Peak Capacity = none**	**Today's Unit Cost ($/AF): $1,000-$1,800** Costs include purchased water, fixed capital costs for storage facilities, maintenance costs, storage fee, and MWD wheeling charges.
Delivery and Benefit: Water would be delivered through MWD's system to MNWD by exchange. • Provides supply reliability benefits under droughts and Delta Levee failure • Does not provide system reliability benefits under Diemer WTP outage	**Issues:** • Acquiring water for purchase to be stored • Agreement with MWD on wheeling and delivery • Agreement with IRWD if Strand Ranch is to be used for banking

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

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Supply Option 6: Colorado River Water Transfer

Purchase of water from Cadiz or other water-selling entity that provides water transfers for Colorado River Aqueduct. **Supply is base loaded**. **Annual Yield = 1,000 AFY** **Peak Capacity = none**	**Today's Unit Cost ($/AF): $1,100-$1,400** Costs include purchased water, and MWD wheeling charges. Risks for possible water quality improvements and yield fall to seller, not buyers of water.
Delivery and Benefit: Water would be delivered through MWD's system to MNWD by exchange. • Provides supply reliability benefits under droughts and Delta Levee failure • Does not provide system reliability benefits under Diemer WTP outage	**Issues:** • Agreement with current Cadiz partners or other selling entity • Agreement with MWD on wheeling, delivery operations, and water quality • Potential for large cost escalation over time, as it is tied to MWD rates

MWD Tier 2 Treated Water will be $1,055/AF in 2015.

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Future Cost Assumptions

- Fixed capital costs (for those projects that have them) are debt financed at 5% for 30 years and **do not escalate over time.**
- Variable cost of project operations (e.g., desal O&M, groundwater pumping) **escalate at 3% per year.**
- MWD wheeling charges (for those options that include that) **escalate at 4% per year.**
- MWD fully loaded treated water **escalate at 5% per year.***

* Actual MWD treated water rates have increased over 7.5% annually, on average, from 2003 to 2013.

Portfolios

Status Quo	Low Cost	High Reliability	High Diversity
Existing Reuse	Existing Reuse	Existing Reuse	Existing Reuse
Existing Storage	Existing Storage	Existing Storage	Existing Storage
Baker WTP	Baker WTP	Baker WTP	Baker WTP
MWD Water	MWD Water	MWD Water	MWD Water
Water Efficiency	Water Efficiency	Water Efficiency	Water Efficiency
	Expanded NPR	**Expanded NPR**	**Expanded NPR**
	OC Basin Storage	**Seawater Desal**	**OC Basin Storage**
			SJB Groundwater
			CV Banking
			CR Transfer

New options in green.

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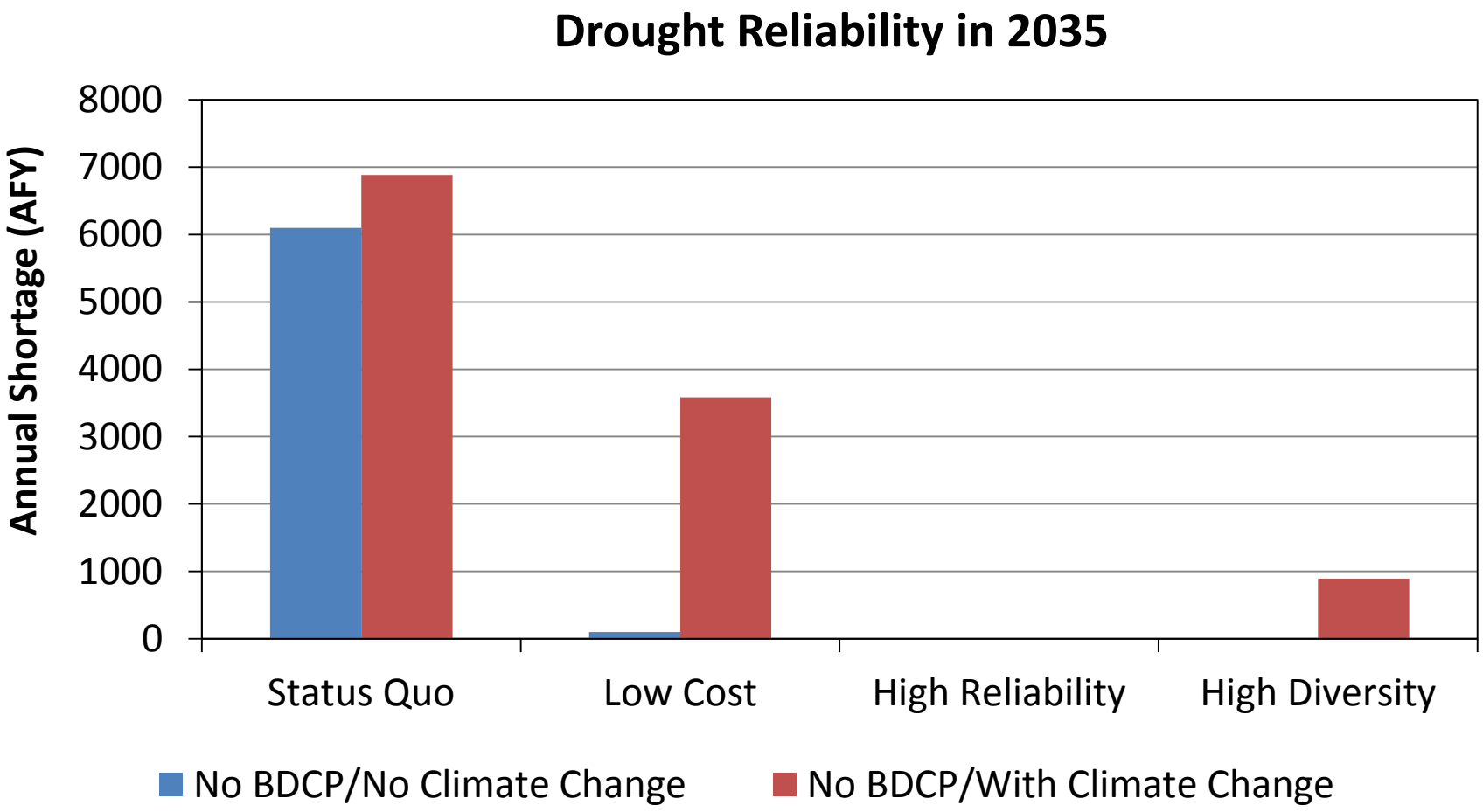
Portfolio Performance



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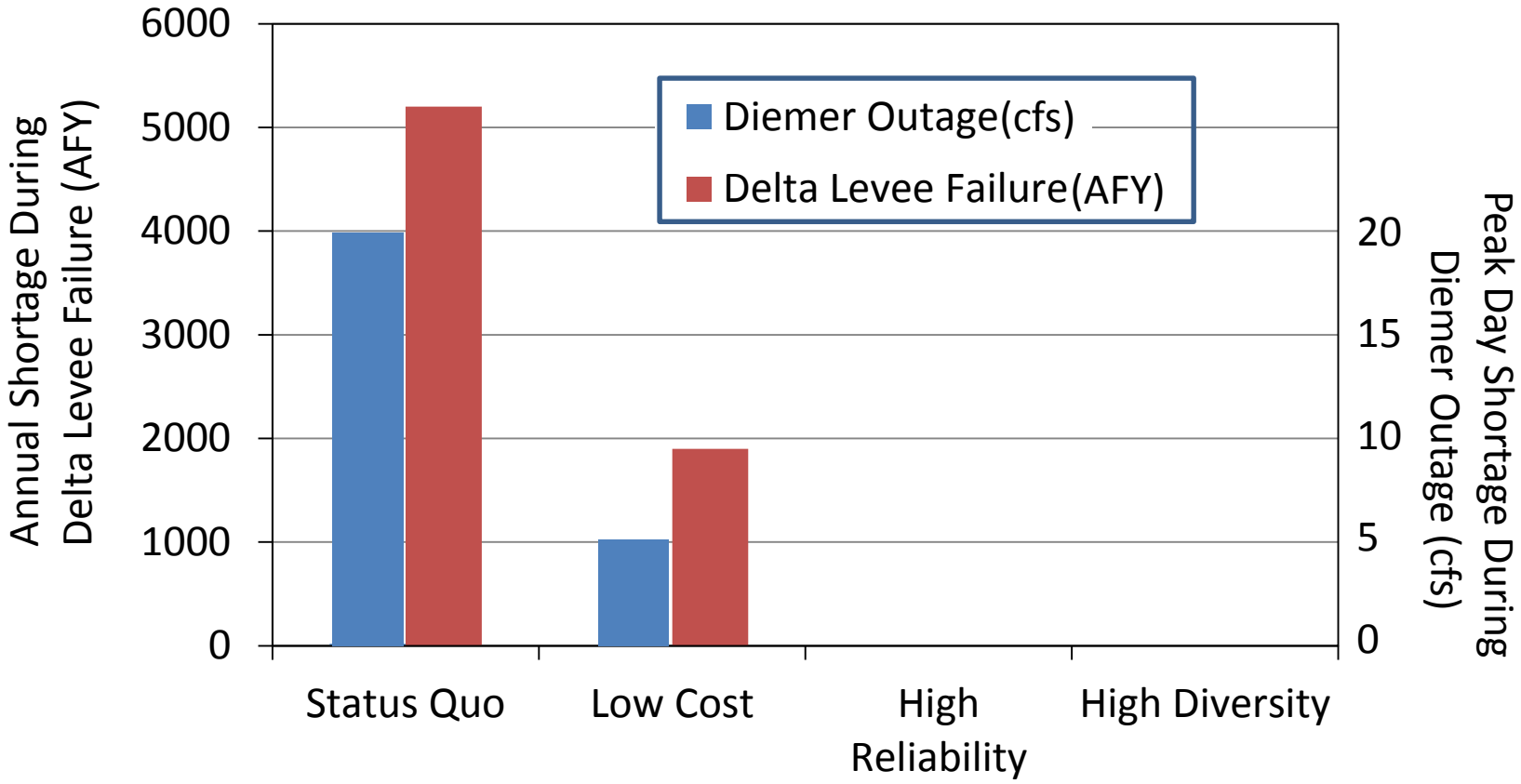
Portfolio Performance

Reliability Under No BDCP and With Climate Change in 2035



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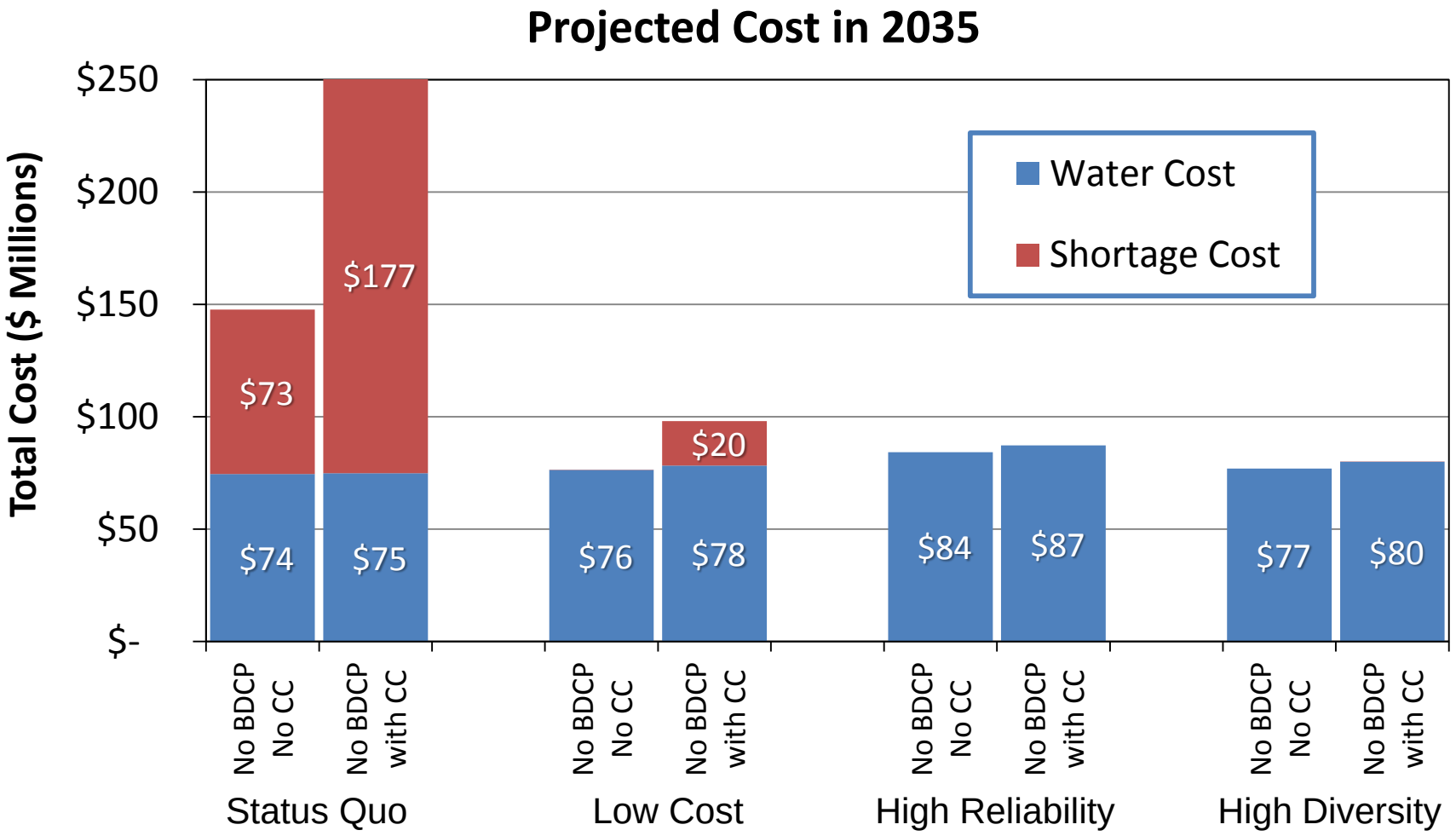
Portfolio Performance



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Qualitative Scores

Implementation Ease:

1 = Very difficult to implement
3 = Moderately difficult to implement
5 = Easy to implement

Finished Water Quality

1 = High in TDS
3 = Moderately high in TDS
5 = Low in TDS

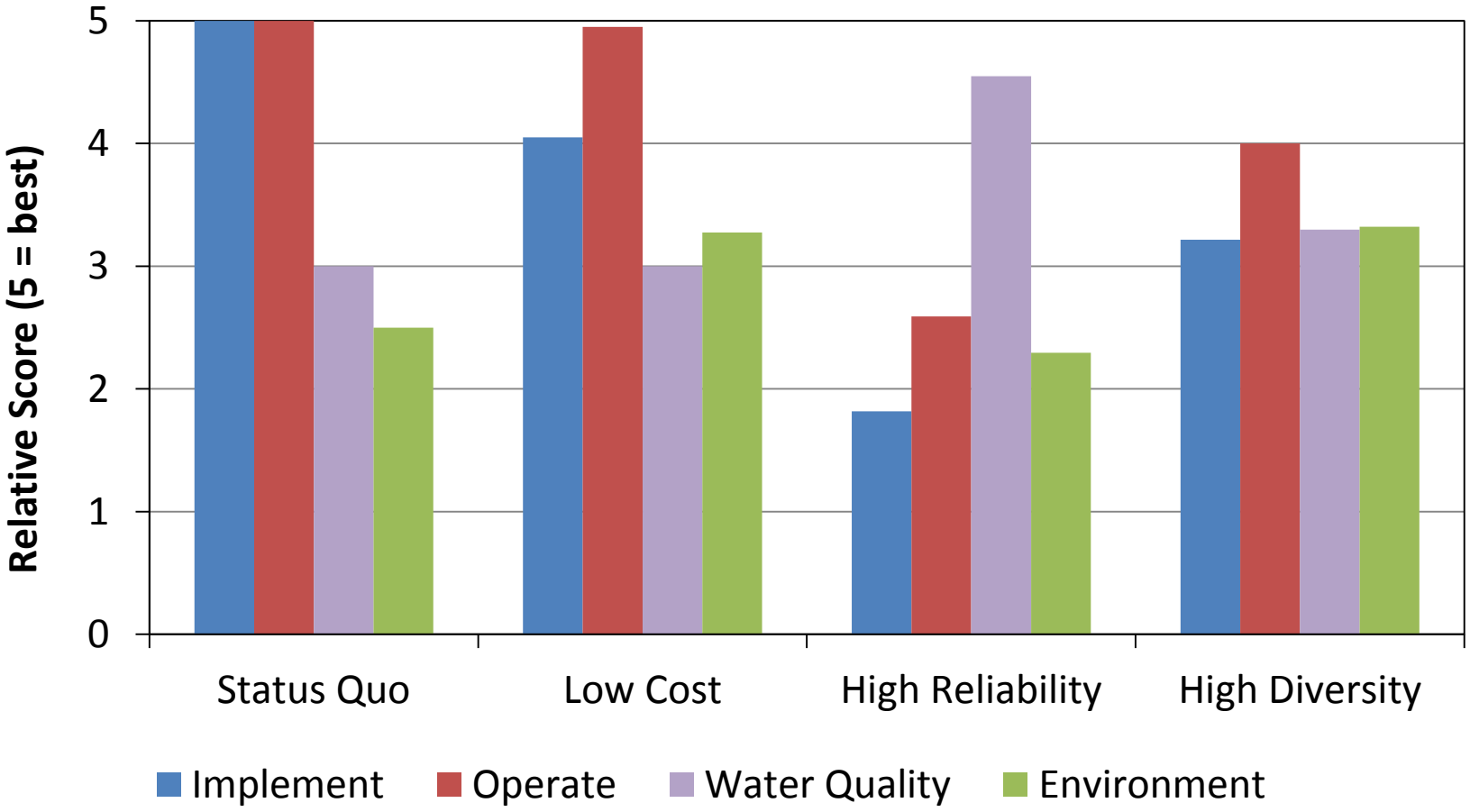
Operational Ease:

1 = Very difficult to integrate into system
3 = Moderately difficult to integrate into system
5 = Easy to integrate into system

Environmental Aspects

1 = No benefit to ecosystem (incl. Delta) and significant impact on local environment from operations
3 = Moderate benefit to ecosystem and some local environmental impacts
5 = Significant benefit to ecosystem and minimal local impacts

Portfolio Performance



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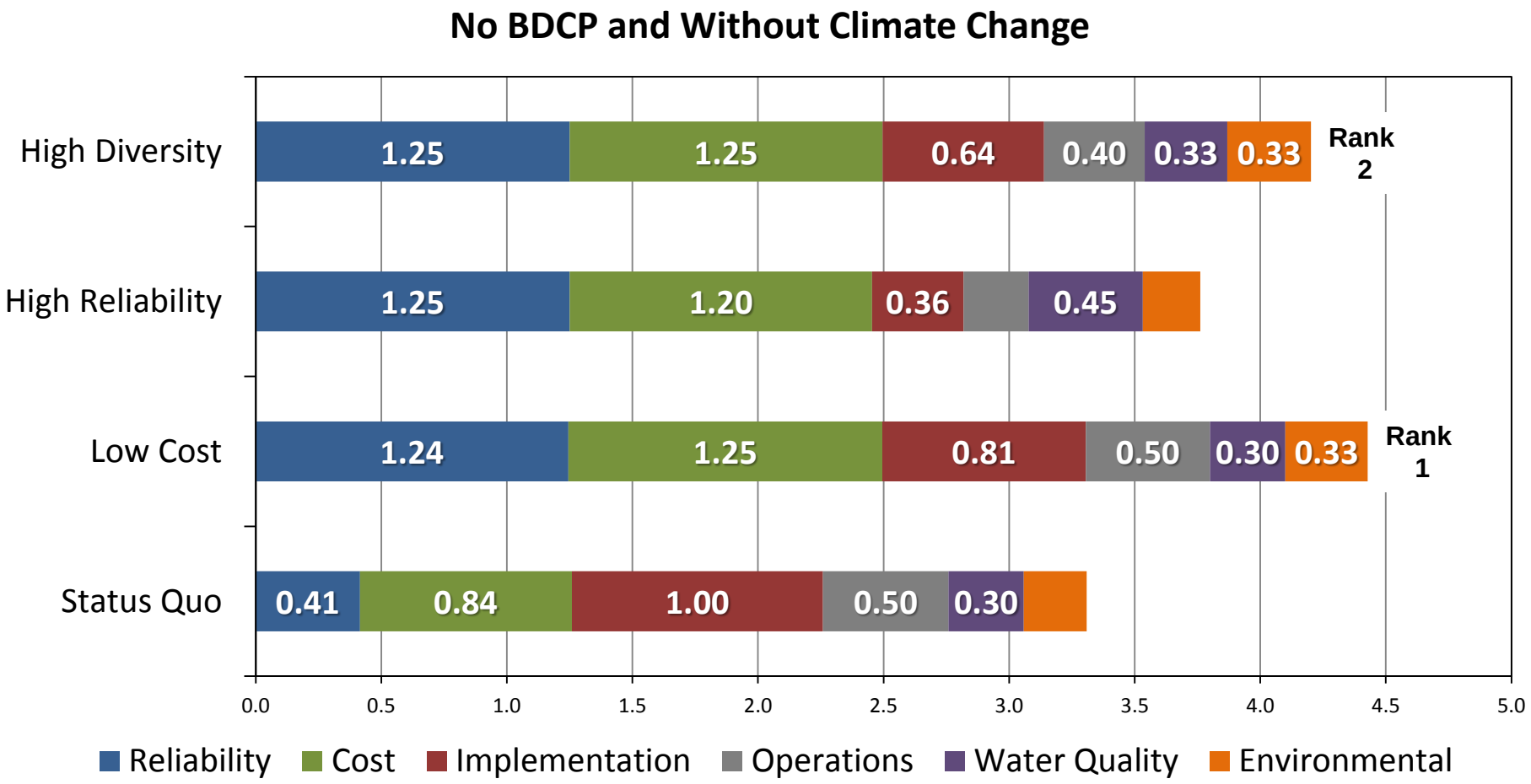
Base Ranking



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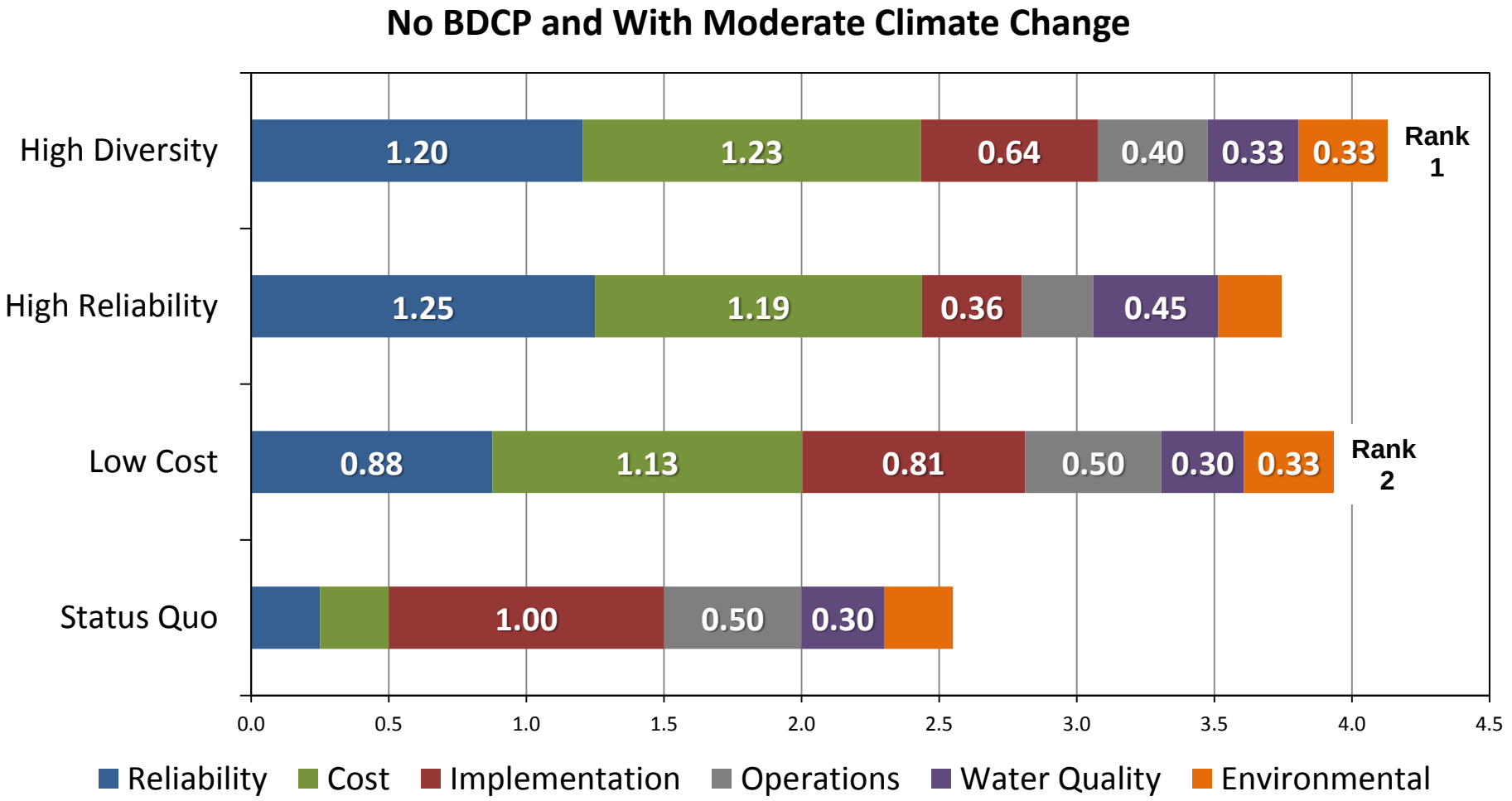
Alternative Ranking



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Ranking Sensitivity

Portfolio	Water Supply Scenarios			
	No BDCP and without Climate Change	No BDCP and with Climate Change	BDCP and without Climate Change	BDCP and with Climate Change
Status Quo	**4**	**4**	**3**	**3**
Low Cost	**1**	**2**	**1**	**1**
High Reliability	**3**	**3**	**4**	**4**
High Diversity	**2**	**1**	**2**	**2**

Rank of 1 is best, 4 is worst.

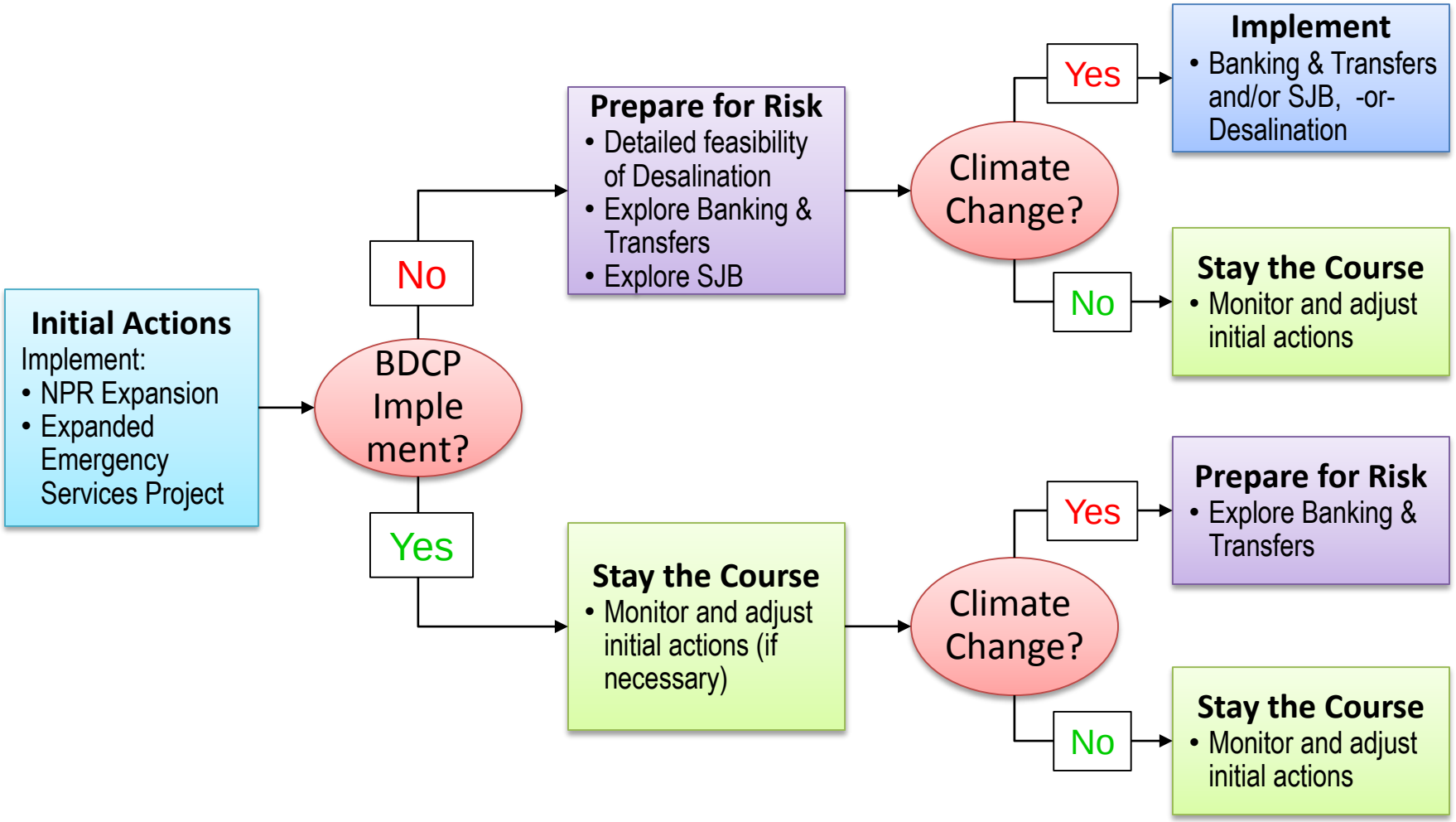
Ranking Sensitivity

Portfolio	Water Supply Scenarios			
	No BDCP and without Climate Change	No BDCP and with Climate Change	BDCP and without Climate Change	BDCP and with Climate Change
Status Quo	**4**	**4**	**3**	**3**
Low Cost	**1**	**2**	**1**	**1**
High Reliability	**3**	**3**	**4**	**4**
High Diversity	**2**	**1**	**2**	**2**

Rank of 1 is best, 4 is worst.

Low Cost Portfolio is most robust, ranking number 1 in 3 out of 4 scenarios

Recommended Adaptive Management



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Next Steps

Before implementation of any supply option, the following is required:

- Detailed project planning and feasibility (refined yield and cost estimates, location of facilities, draft agreement terms)
- Engineering pre-design for required facilities
- Environmental documentation for required facilities and final agreement terms
- Engineering final design for required facilities

Schedule for LRWRP

Milestone	Date
Review Draft Report (staff, other agencies, Board)	Mid Nov, 2014
Incorporate Comments on Draft Report	Early Dec, 2014
Prepare Final Report	Late Dec, 2014
Conduct Detailed Planning Studies	2015-2016
Design, Environmental, Agreements	2017-2018
Implement Near-Term Projects	2017-2020

Questions?

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