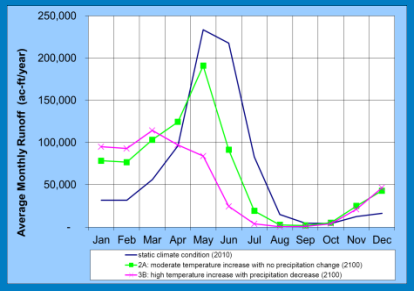


Preparing for Climate Change: An Assessment Perspective

David Behar

Climate Program Director

San Francisco Public Utilities Commission

North Bay Watershed Association 2012 Conference

April 13, 2012

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

San Francisco Water Power Sewer

The Stakes on Climate Change:
Water and Clean Water Sector Only

2011-2031: Without Adaptation

Drinking Water Infrastructure Investment

$335 Billion [1]

Clean Water Infrastructure Investment

$298 Billion [2]

By 2050: Potential Adaptation Costs

Drinking Water + Clean Water Sector:

$448 - 944 Billion [3]

[1] "2009 Drinking Water Infrastructure Needs Survey and Assessment: Third Report to Congress." USEPA Office of Water, 2005.

[2] "Clean Watersheds Needs Survey 2008: Report to Congress." USEPA, May 2010.

[3] "Confronting Climate Change: An Early Analysis of Water and Wastewater Adaptation Costs," Association of Metropolitan Water Agencies, National Association of Clean Water Agencies, 2009.

Water Utility Climate Alliance

43 million drinking water customers

WUCA
Water Utility Climate Alliance

Mission Statement

The Water Utility Climate Alliances provides leadership in assessing and adapting to the potential effects of climate change through collaborative action. We seek to enhance the usefulness of climate science for the adaptation community and improve water management decision-making in the face of climate uncertainty.

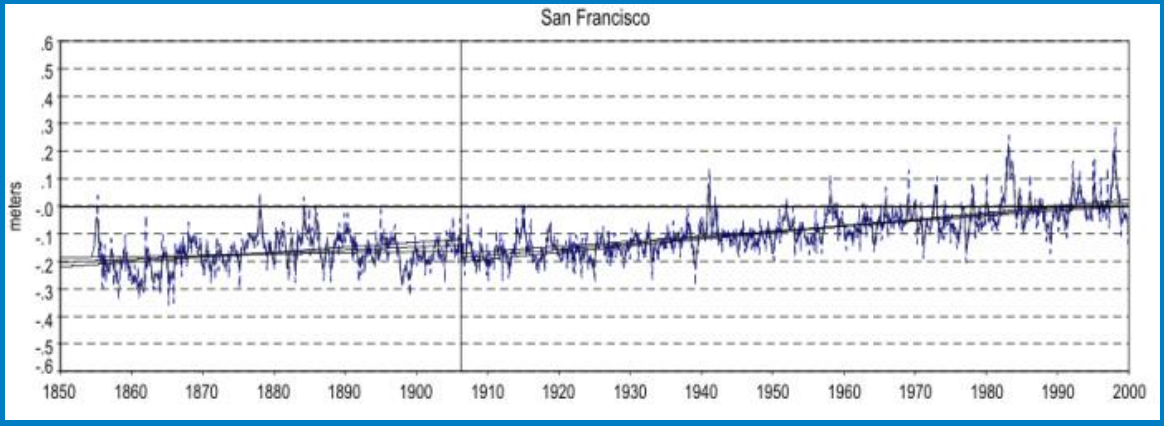
San Francisco Water Power Sewer

A core objective…

"Actionable Science"

A Working Definition:

Data, analysis, and forecasts that are <u>sufficiently</u> predictive, accepted and understandable to <u>support</u> decision-making, including <u>capital investment</u> decision-making.

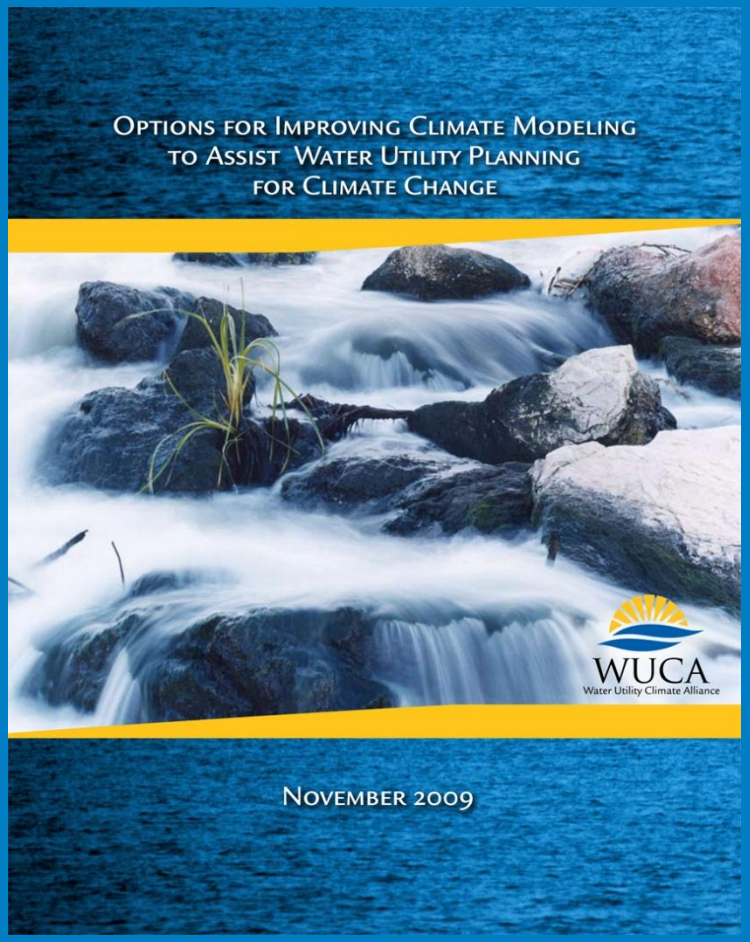


Climate Modeling White Paper

"Options for Improving Climate Modeling to Assist Water Utility Planning for Climate Change"

Authors:

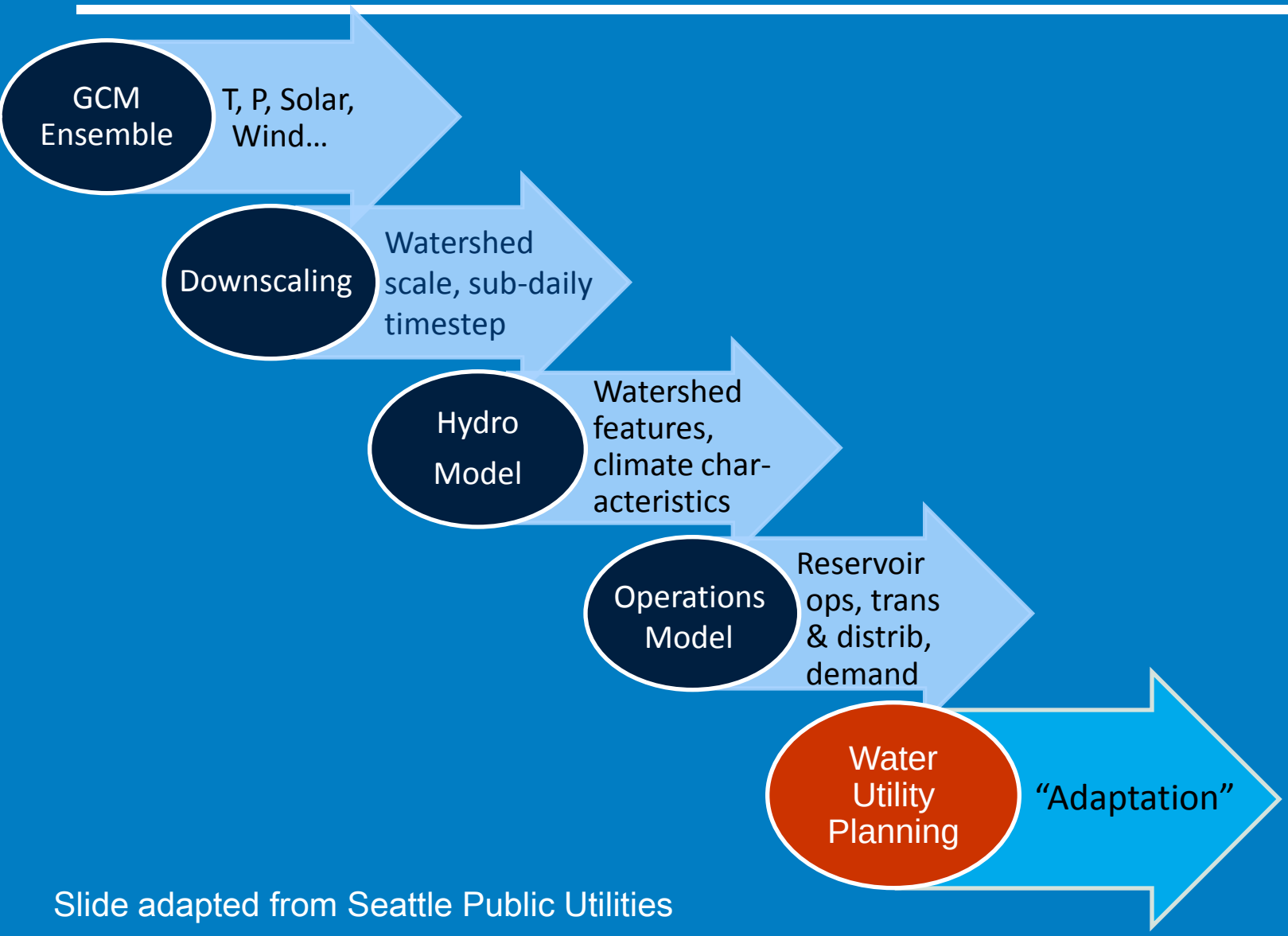
Joe Barsugli, Chris Anderson, Joel Smith, Jason Vogel



Available at

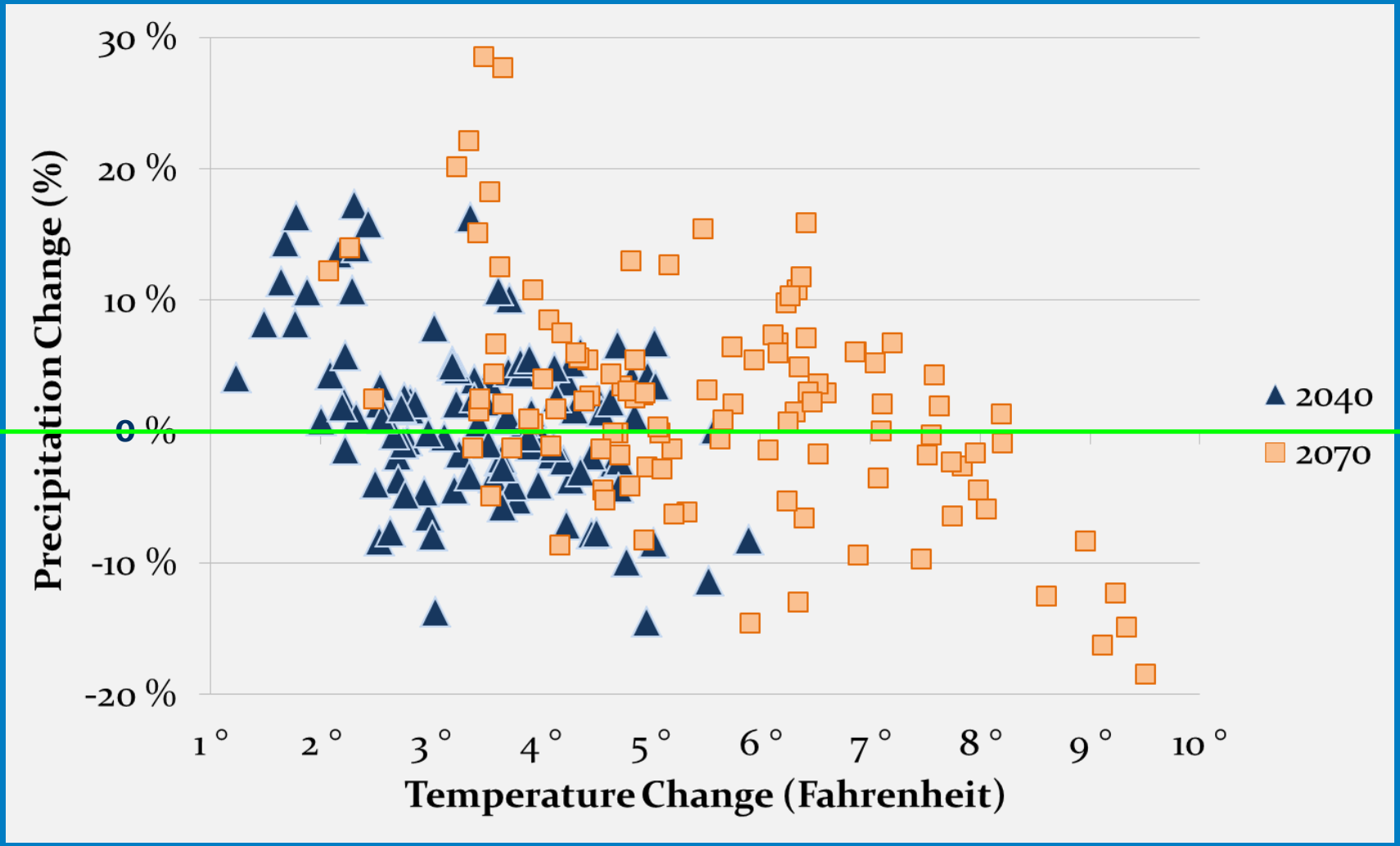
www.wucaonline.org

Chain of Models



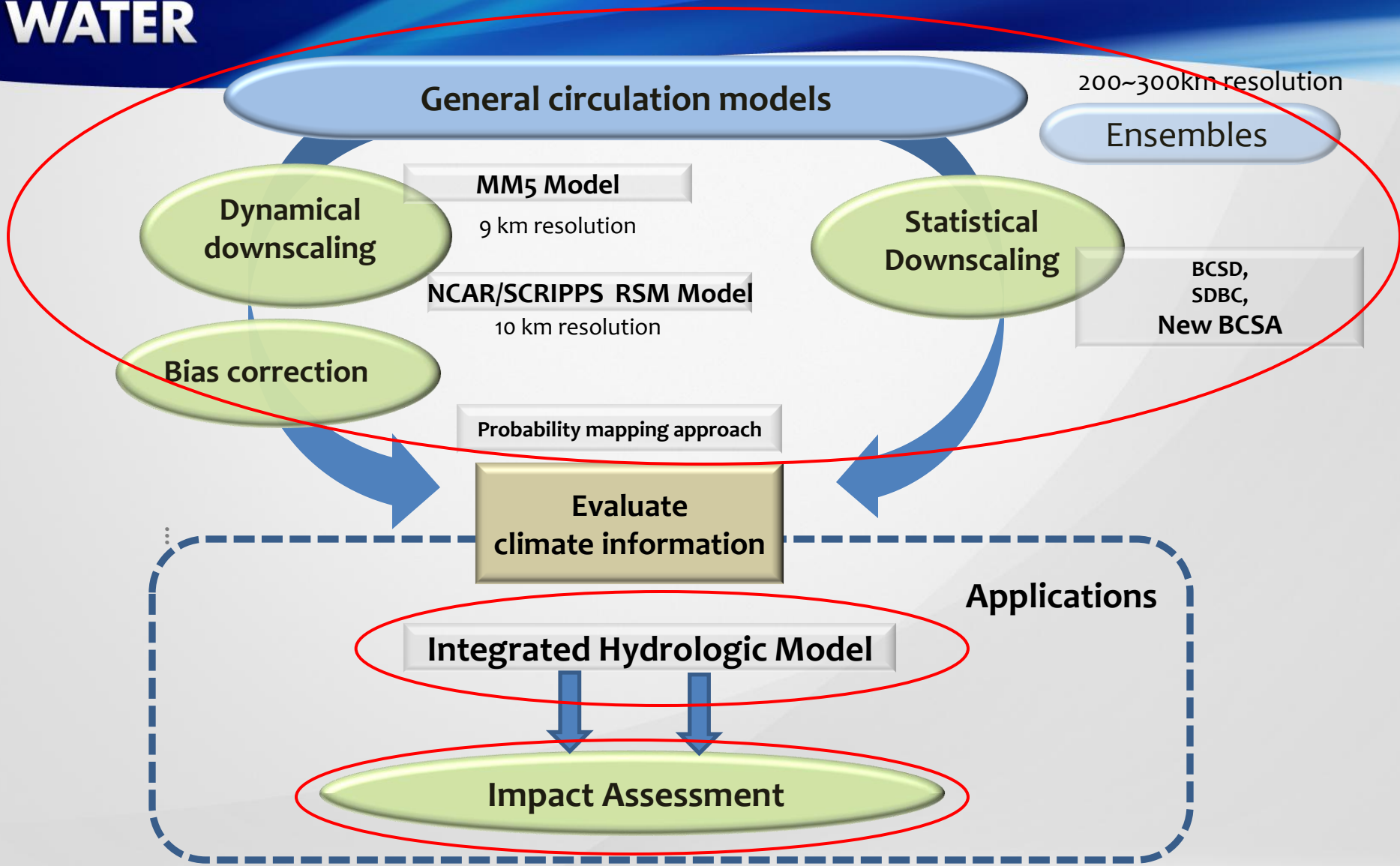
Slide adapted from Seattle Public Utilities

Projected Changes for Denver's Watershed (Front Range Study, 2012)

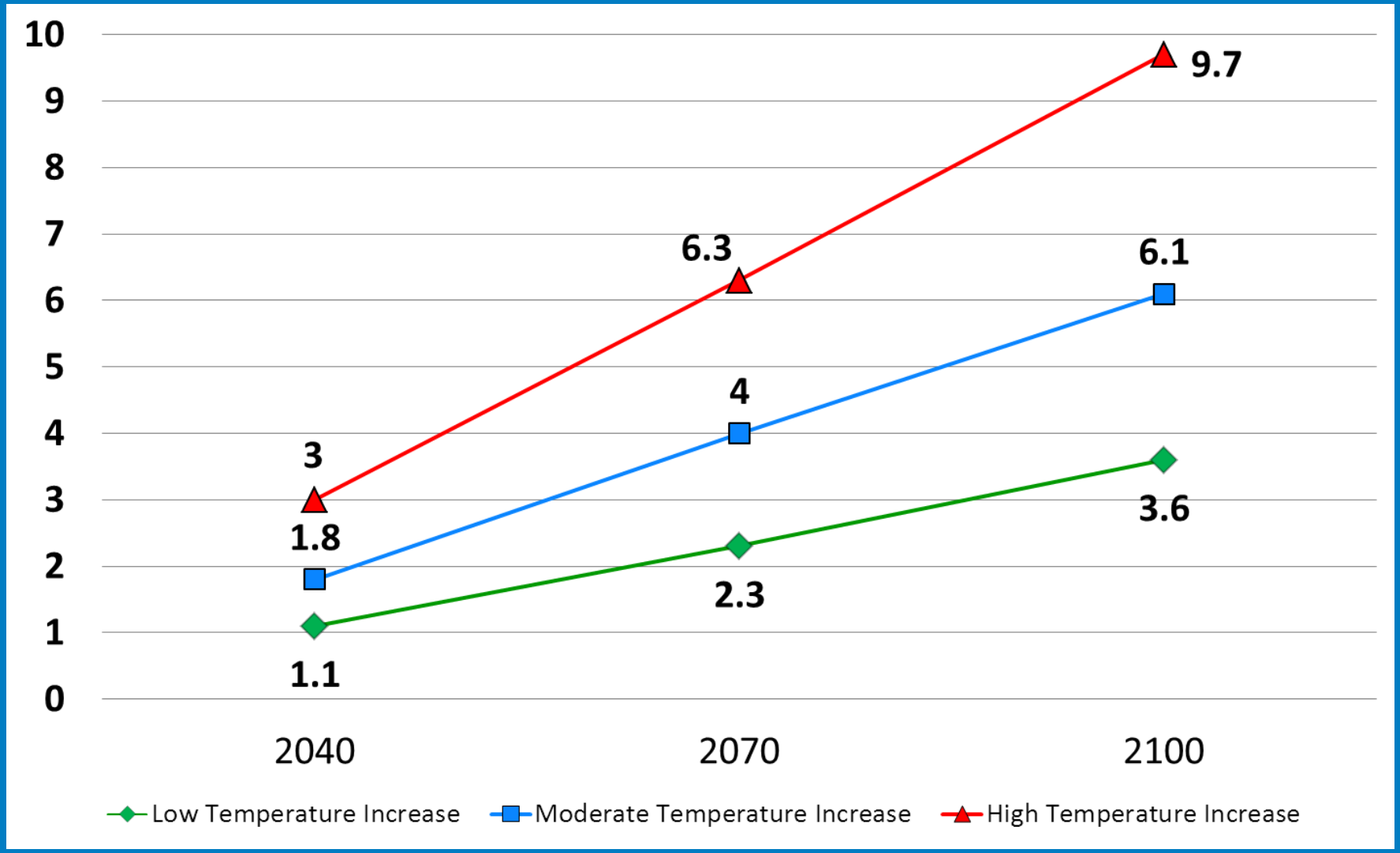


Slide courtesy Denver Water

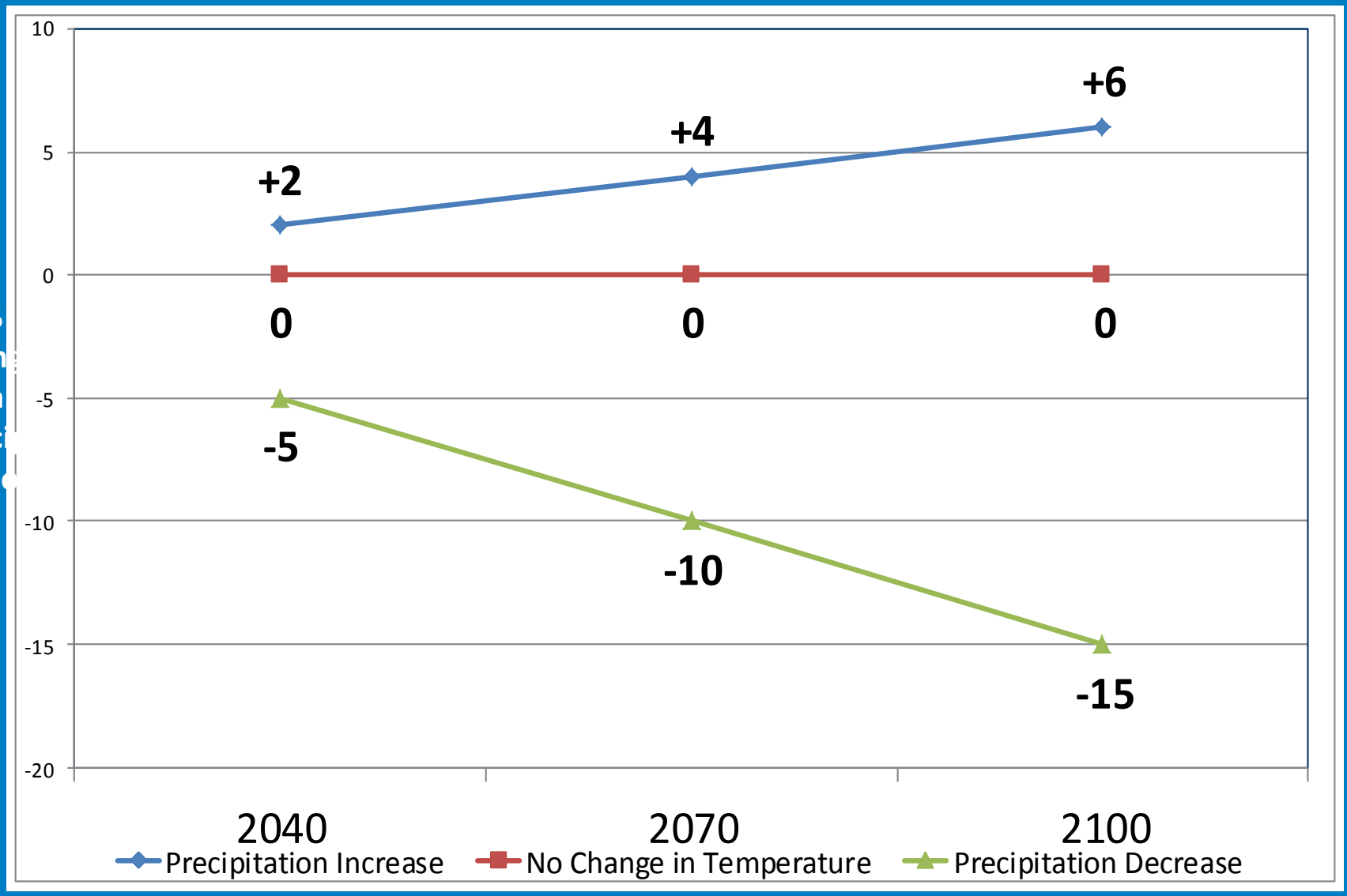
Climate Change Assessment Framework



SFPUC Sensitivity Analysis: Temperature



SFPUC Sensitivity Analysis: Precipitation



Sensitivity Analysis – Streamflow to Temperature and Precipitation Change

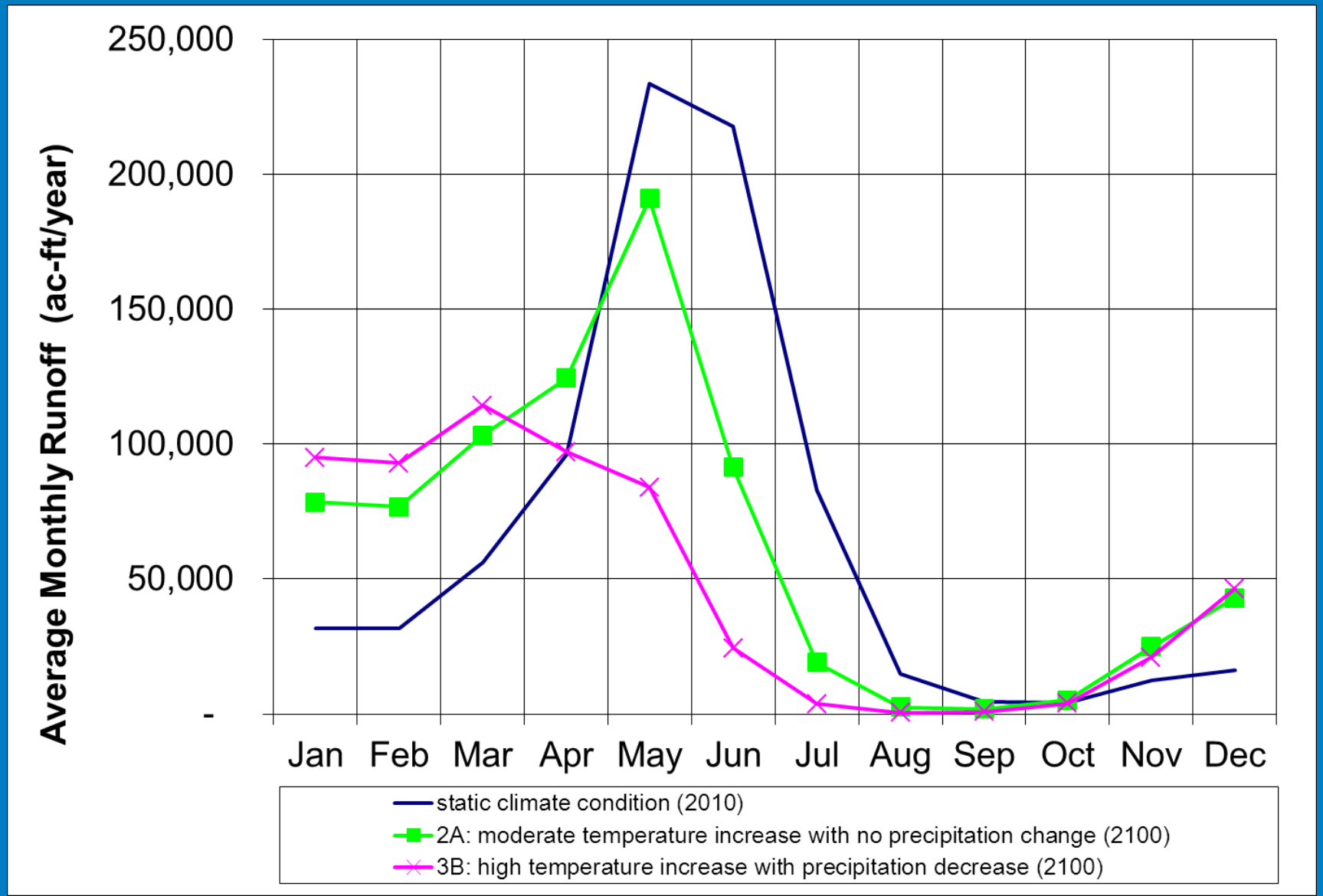
	2040	2070	2100
Temperature Precipitation	+ 0.6 deg C + 0%	+ 1.3 deg C + 0%	+ 2 deg C + 0%
Temperature Precipitation	+ 1 deg C + 0%	+ 2.2 deg C + 0%	+ 3.4 deg C + 0%
Temperature Precipitation	+ 1 deg C - 5%	+ 2.2 deg C - 10%	+ 3.4 deg C - 15%
Temperature Precipitation	+ 1 deg C + 2%	+ 2.2 deg C + 4%	+ 3.4 deg C + 6%
Temperature Precipitation	+ 1.65 deg C + 0%	+ 3.5 deg C + 0%	+ 5.4 deg C + 0%
Temperature Precipitation	+ 1.65 deg C -5%	+ 3.5 deg C -10%	+ 5.4 deg C -15%

Median Runoff into Hetch Hetchy
(results based on 1975-2008, median year is 2003)

Change in Median Runoff volume for future climate conditions

Climate Change Scenario		Hetch Hetchy Runoff (% change from 2010)		
		2040	2070	2100
1A	Low temperature increase No precipitation change	-1%	-2%	-3%
2A	Moderate temperature increase No precipitation change	-1%	-3%	-5%
2B	Moderate temperature increase Precipitation decrease	-8%	-16%	-25%
2C	Moderate temperature increase Precipitation increase	-1%	+2%	+2%
3A	High temperature increase No precipitation change	-2%	-6%	-10%
3B	High temperature increase Precipitation decrease	-9%	-19%	-29%

Monthly Runoff into Hetch Hetchy: Two Climate Scenarios for Yr 2100



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A bit like the Wild West out there…

“No Regrets” Strategies

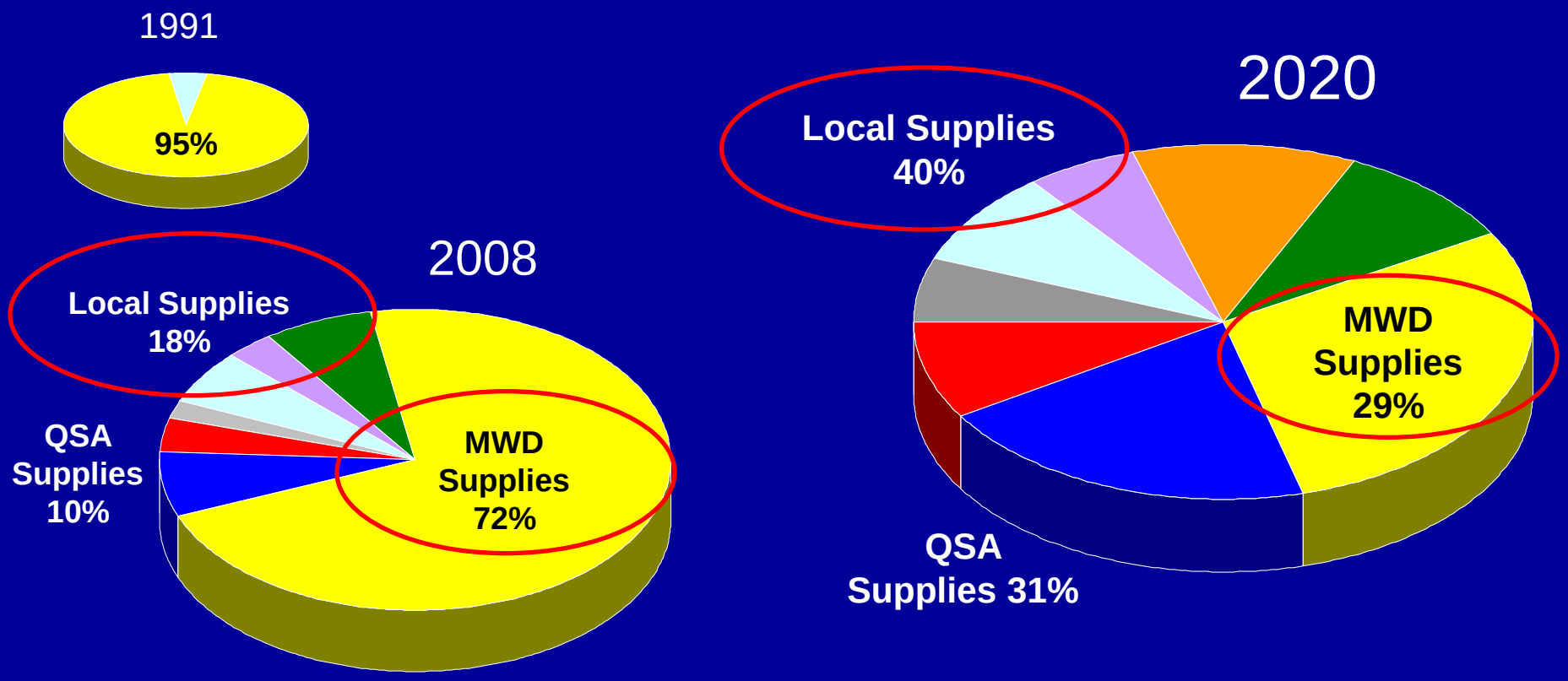
* Planning for Drought

* Planning for Regulation

* Planning for Climate Change

Is there a difference?

Diversifying San Diego County's Water Supply Portfolio

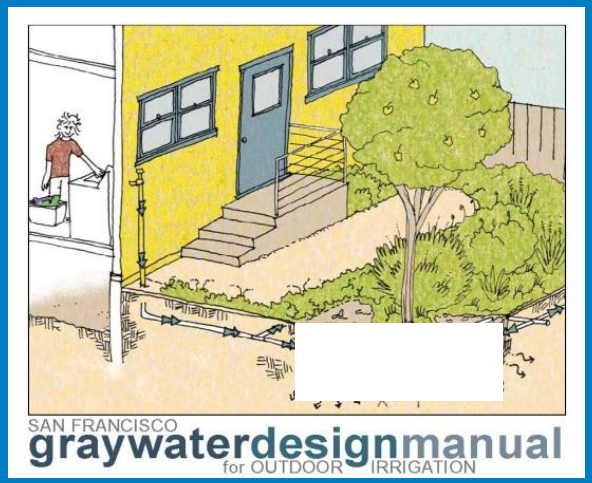


Slide Courtesy San Diego County Water Authority

San Francisco PUC: Diversifying Local Water Supplies

Developing local water supplies to rely less on imported snow-dependent supplies:

- Conservation
- Recycled Water
- Groundwater
- Graywater Program
- Rainwater Harvesting



Regional Integrated Water Management

Collaborate in water management:

- Interties between systems

Partner in new supply development:

- Bay Area Regional Desalination project

San Francisco Water Power Sewer

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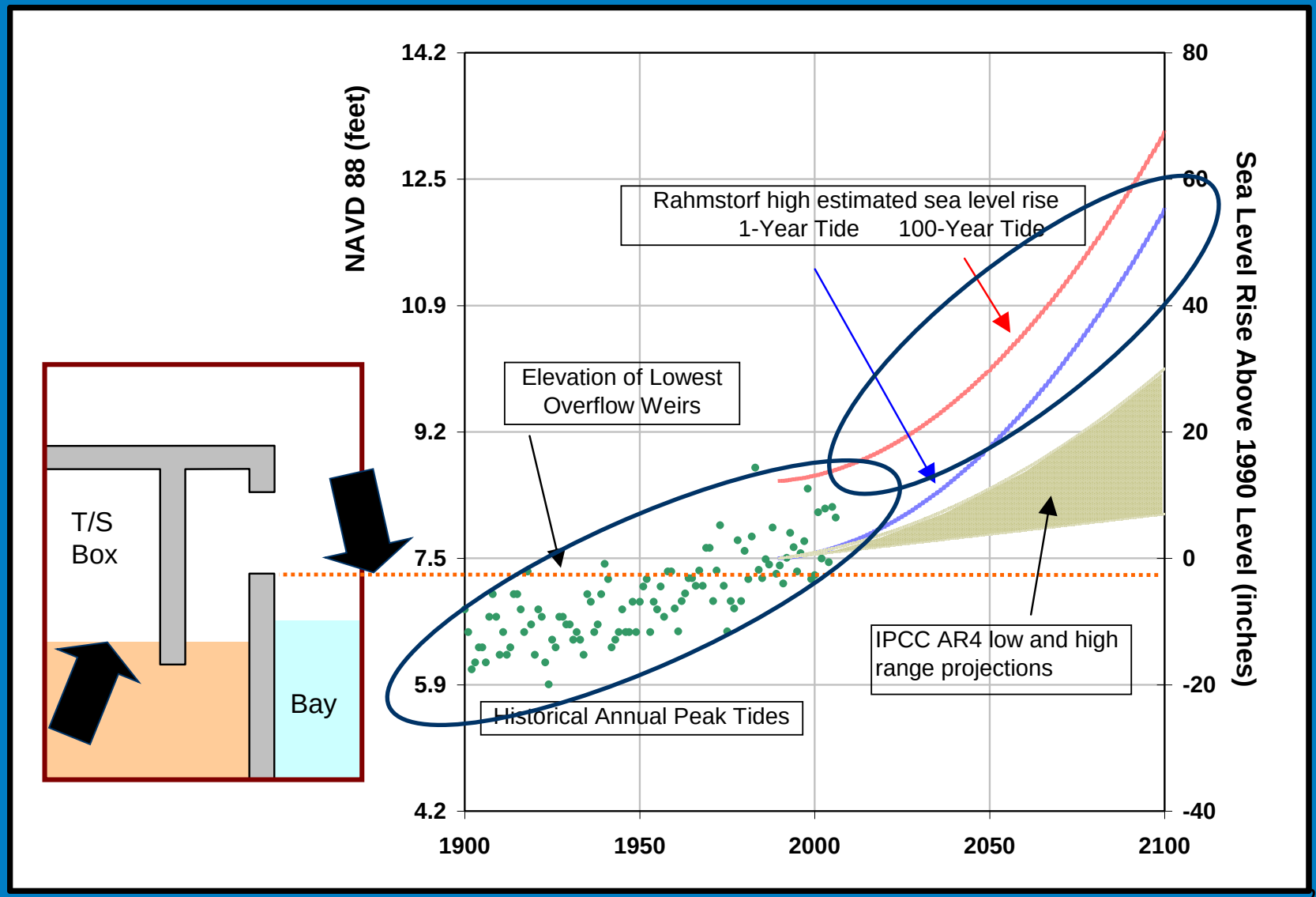
Sea Level Rise: Today's Adaptation Challenge

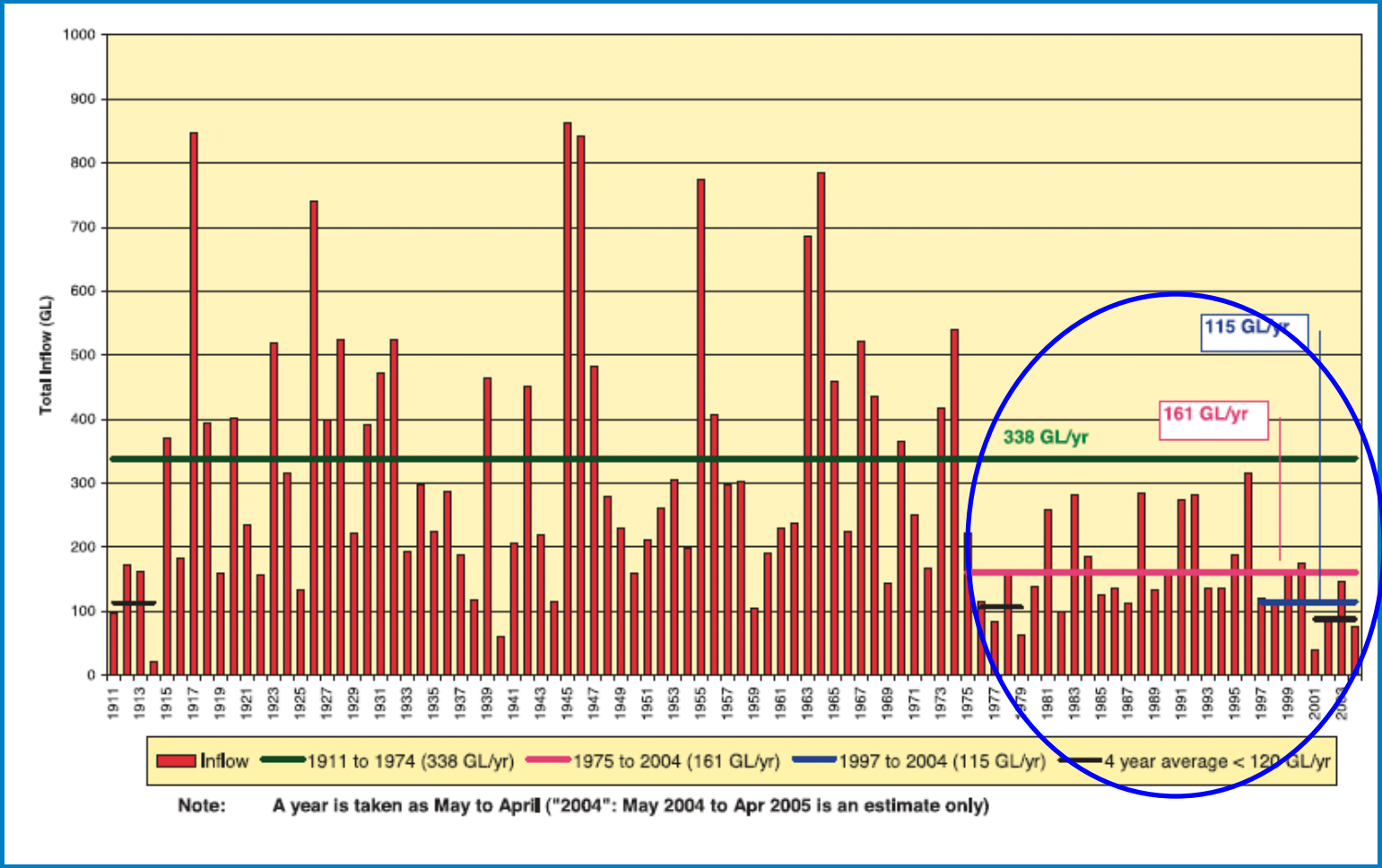


Backflow Prevention for twenty-nine bayside discharges/collection points

Current status:

- Today: 16 of 29 overflow weirs have backflow during the seasonal high tides.
- Total Project Costs: $20-40 million over 5 years.

Perth: Storage inflows (1911-2003)



Thank you

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