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CRWUA

Colorado River Conversations Project

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Reframing our Relationship with Science

- To promote a better functioning river system in the future….
- Considering implications of extreme, black swan events beyond climate extremes, including economic upheavals, governance resets, etc.
- And mechanisms to include a broader array of voices in river management
- How to engage science in operational decision-making? In renegotiations of the Guidelines?

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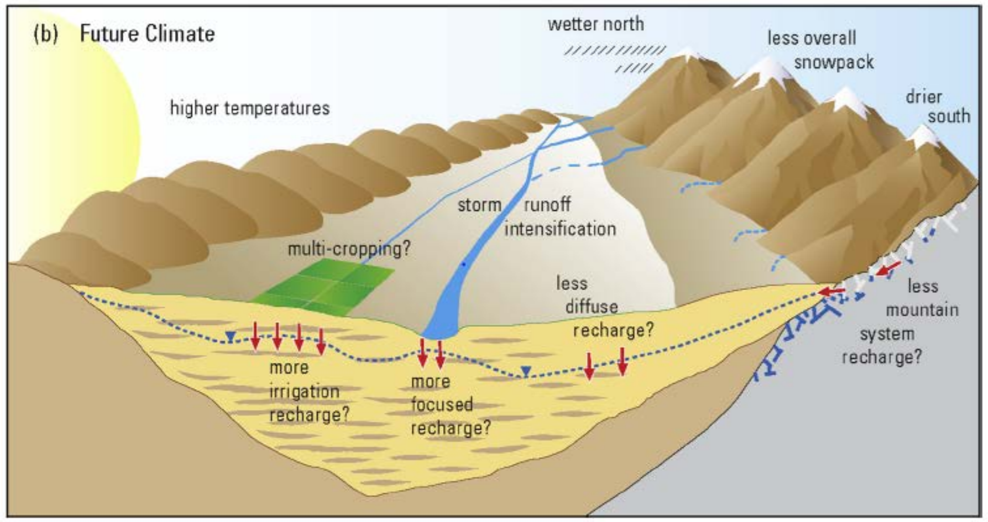
October, 2017 Colorado River Conference
University of Arizona

In a more perfect world, a systems-based approach to management would be advisable that respects both ecological systems and social systems (cultures, institutions, etc.) and treats them in a more integrated way (for example, valuing the concepts of "ecosystem services", or "traditional knowledge", in decision processes).

A Systems Approach to River Management



Meixner et al., 2015, Journal of Hydrology

Can we arrive at a more process-based understanding of the intersections of groundwater and surface water systems in the Basin in the context of climate change, and what are the implications for current and future seasonal flows and riparian and aquatic ecosystems?

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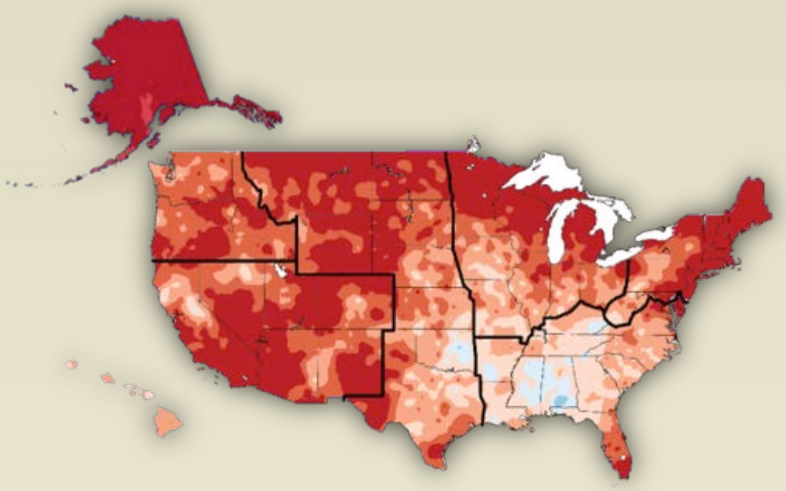
A Systems Approach to River Management



There is also a need to think about the drivers of change using a more system-wide perspective, at multiple scales, so that the implications of change can be better understood from the headwaters to the Delta.

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Scenario Planning Workshop Series

Scenario Planning: Implications of the Intersection of Extreme Events

The degree to which extreme events are devastating or manageable to people is largely related to our institutional capacity to prepare and respond.

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What are the threshold events that might overwhelm human and natural systems in the Colorado Basin, and what are our options for anticipating, recognizing, and managing risk before it is too late?

Scenario Planning Process

Step 1: Setting the Context

Step 2: Identification of Drivers

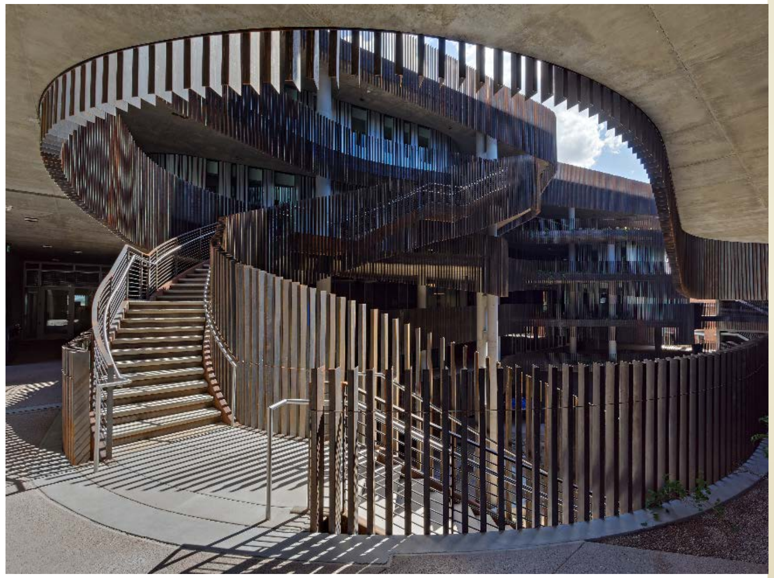
Step 3: Rank Drivers of Change

Step 4: Choose Scenarios

Step 5: Develop Storylines - Summer

Step 6: Impacts of Storylines

June Workshop

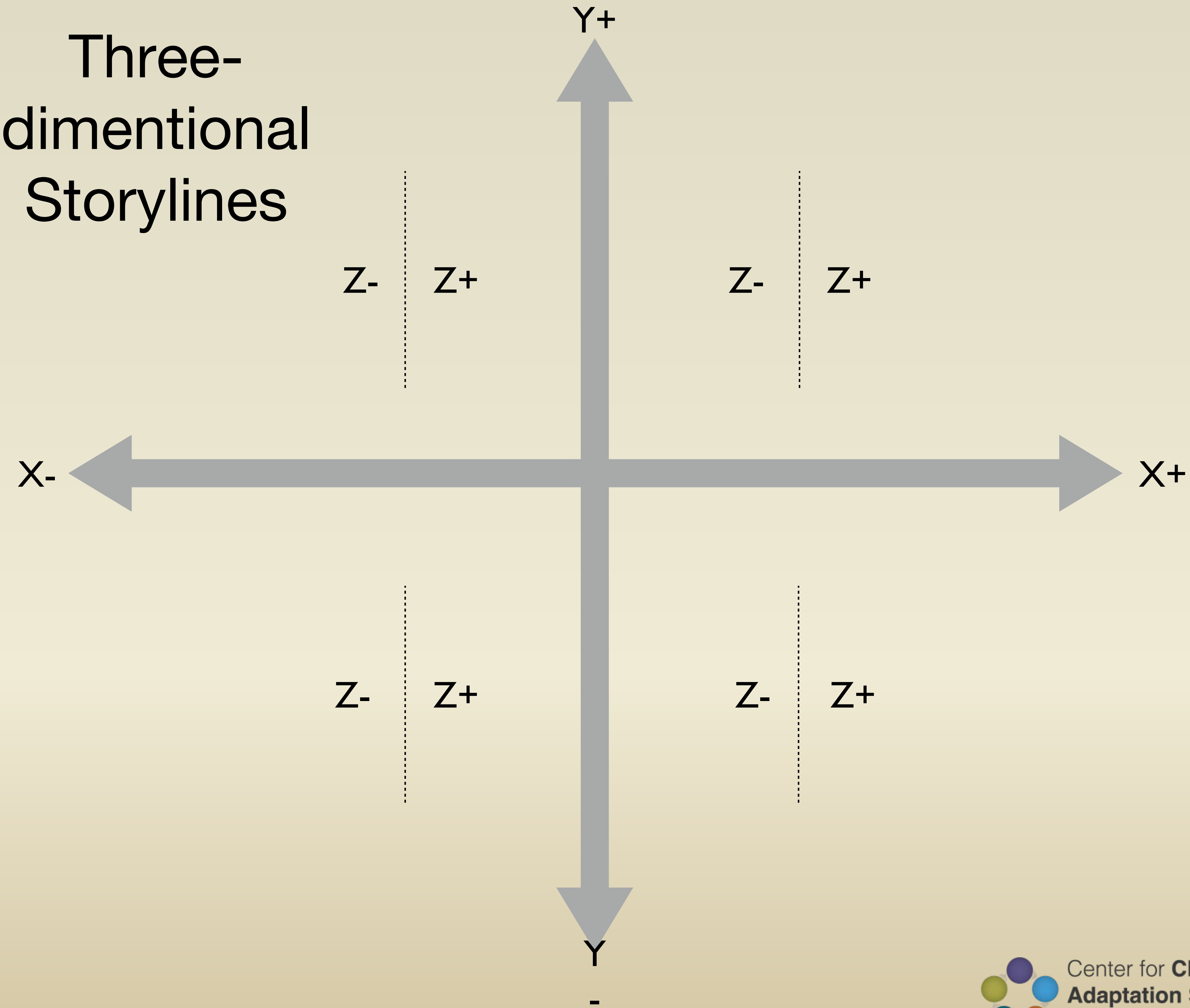


October Workshop

Nightmare Drivers

Economic	Cost of providing energy or water (based on availability or infrastructure)
	Budget for adaptation, mitigation, and monitoring projects
Political	Expertise in government
	Trustworthiness of government agency
Social	Changes in cultural values
	Demographic shifts and population growth
Technological	Augmentation technologies (e.g. desalination, importation, etc.)
Physical	Sediment flows
	Land use changes
Biological	Keystone species extinction
	Invasive plants and loss of key ecosystem functions
Infrastructure	Dam integrity
	Delivery infrastructure integrity

Three-dimentional Storylines



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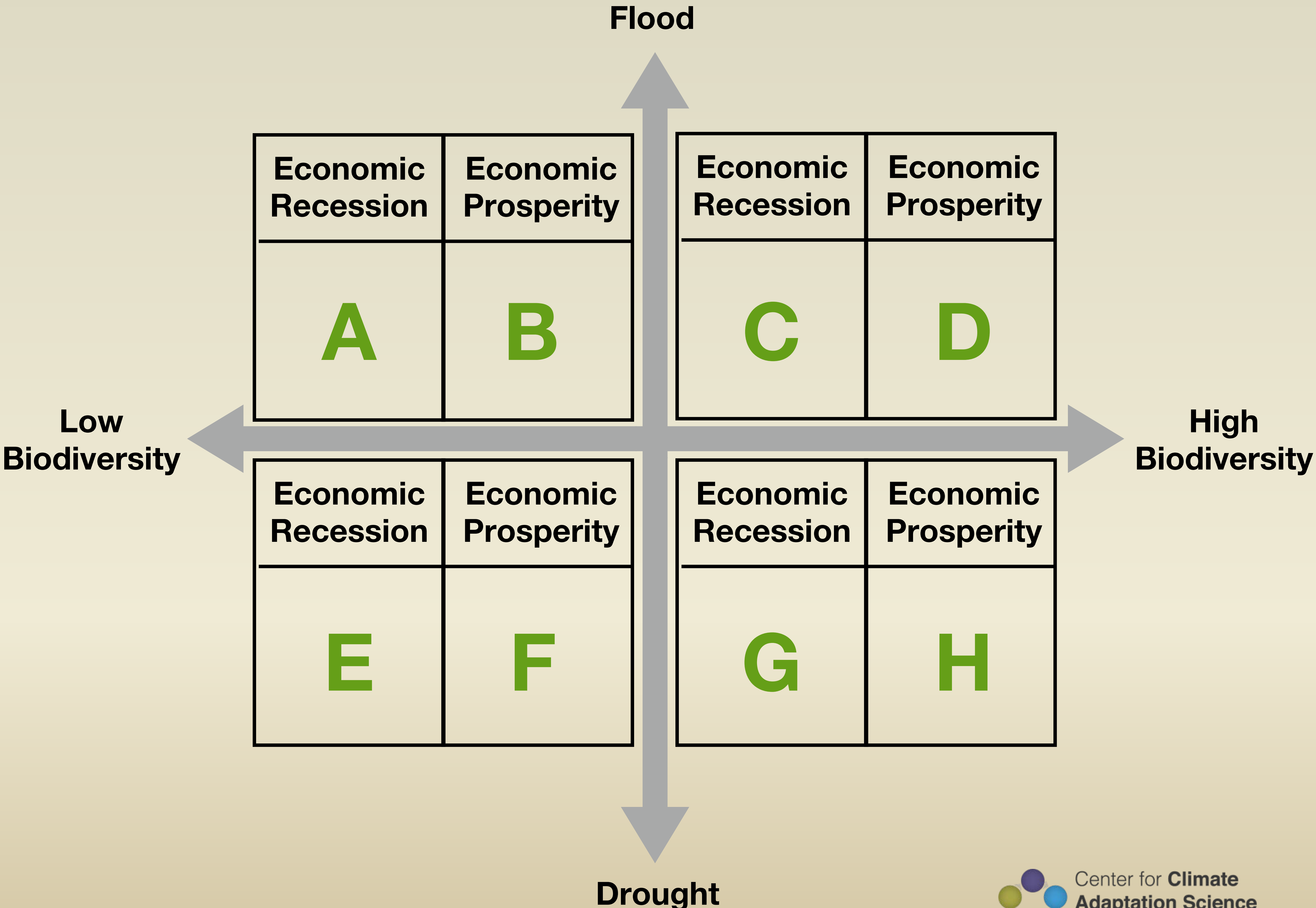

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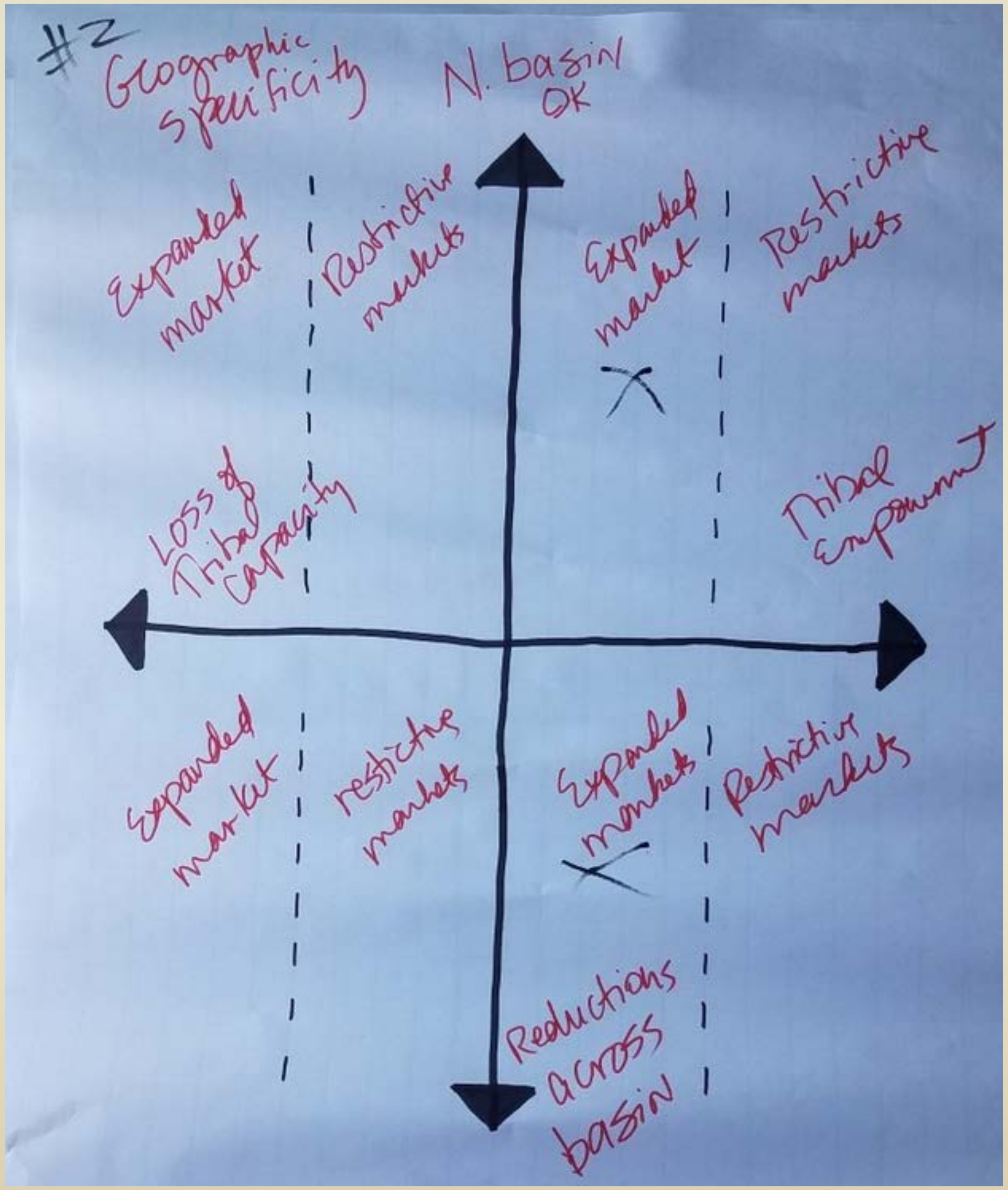
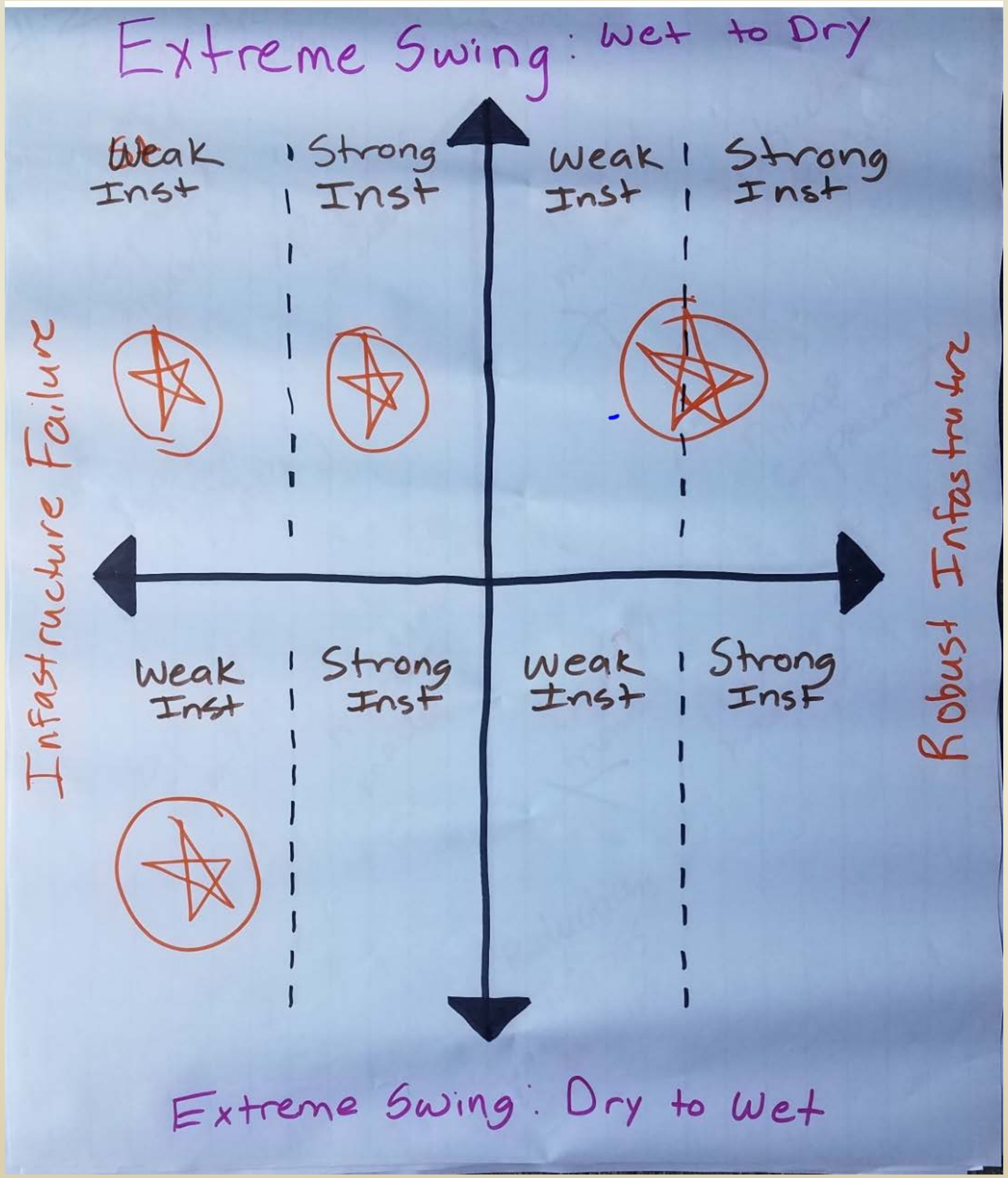
Selecting Storylines





1 - Caught Off Guard

Wet to Dry Swing

Infrastructure Failure

Governance Failure

3 - Arid and Unfair

Long Duration Dry

Increased Wealth Gap

Decrease Inclusivity

5 - Sad Skiers

Less Snow

Low Environmental Values

Decrease in Recreational Economy

7 - Dig It Deeper

No Monsoon

Aquifer Crash

Increased Tribal Engagement in the Lower Basin

2 - Water on the Move

Wet to Dry Swing

Increase in Markets

Increased Tribal Engagement in the Upper Basin

4 - Rural Revival

Long Duration Dry

Rural Agriculture Investment

Transition from Global to Local Economies

6 - Disaster Strikes

Short System Shock of Wet to Dry

Collapse of California Water Systems

Bad Economy

8 - Flood Gates

Dry to Wet Swing

Technological Advances

US-Mexico Collaboration

Next Steps in Scenario Planning

Considering a third workshop to consider solutions that address multiple challenges and focus on building more robust systems

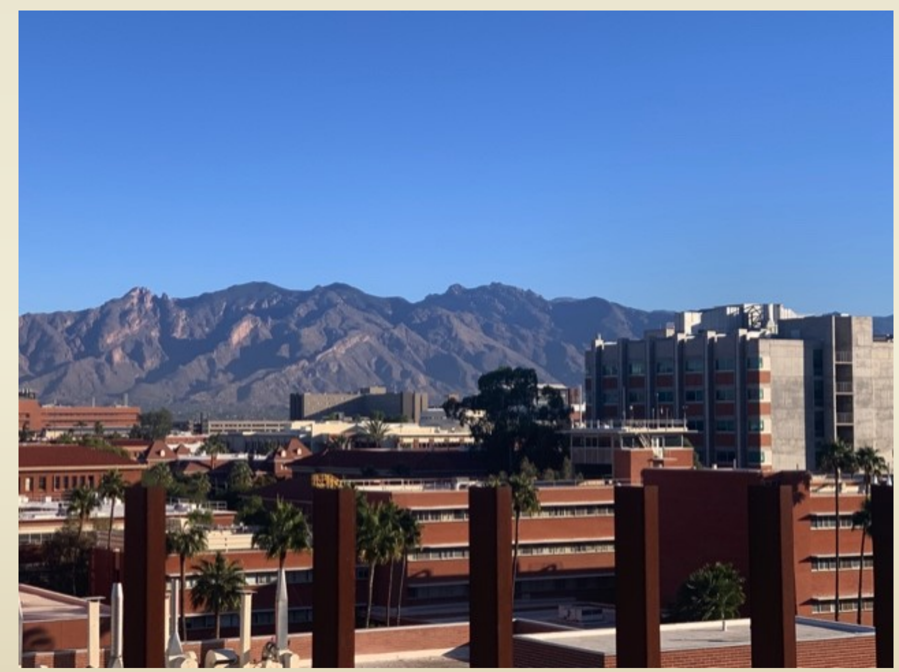
A Broader Array of Voices

"Many water users cannot currently engage effectively in river policy and management, and significant capacity-building is required in order to allow true engagement."

- When 40 million people depend on a river, they can't all have a voice.
- How to have a broader, inclusive process that's manageable? What will be the next generation of communication and engagement strategies that can be harnessed?

Reframing the Role of Science

Can we expand science capacity and relationships between water managers and climate science/adaptation professionals? Can multiple sources of knowledge be usefully integrated?



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