

# *Ecosystem Changes and Water Policy Choices:*

*Four Scenarios for the  
Lower Colorado River Basin  
to 2050*

## **WRRC Annual Conference**

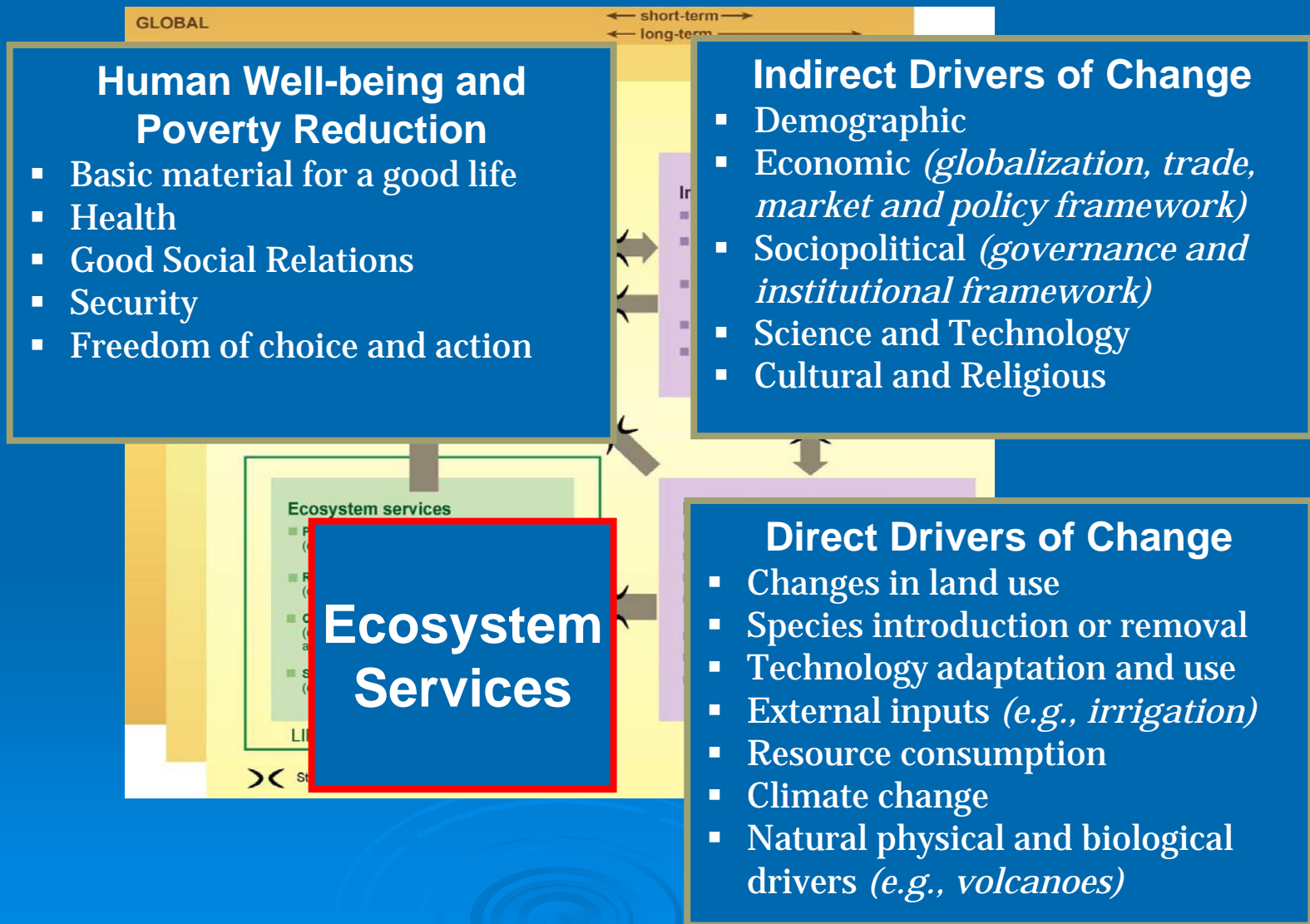
**Arizona Biltmore Resort & Spa  
Phoenix, AZ**

**June 24, 2008**



Mark Lellouch  
Sonoran Institute  
[www.sonoran.org](http://www.sonoran.org)

# Millennium Ecosystem Assessment



# Scenarios for the Lower Basin

## ➤ Drivers

- Climate change
- Population growth
- Policies

## ➤ Outcomes

- Ecosystem changes in the Delta
- Changes in human well-being in the Lower Basin



# Scenario 1: Dry Future

- Long-term drought
- Streamflows keep declining
- Lake Mead level drops
- Compact is eventually scrapped
- New water allocation based on population

CA	4.4 to 4.4 maf	CO	3.9 to 1.2 maf
AZ	2.8 to 2.2 maf	UT	1.7 to 0.7 maf
NV	0.3 to 0.9 maf	WY	1.0 to 0.1 maf
Mexico	1.5 to 1.0 maf	NM	0.8 to 0.4 maf



# Scenario 1: Dry Future (cont'd)

- Agriculture declines, urban water prices skyrocket
- Economic dislocation
- Limited interstate water market
- Quality of life suffers
- Campaign to uproot all vegetation along the LCR
- Delta? What Delta?





# Scenario 2: The Market Rules

- Unfettered interstate water market
- Ambitious augmentation and efficiency projects
- Accelerating rural to urban transfers
- Tremendous urban growth



# Scenario 2: The Market Rules (cont'd)

- Water conservation cannot keep pace with population increases
- Window of opportunity to restore Delta ecosystems closes



# Scenario 3: Powell's Prophecy

- Development of a comprehensive vision for water resources management in the arid West
- Limits on rural to urban transfers
- Aggressive urban water conservation programs and shared best practices





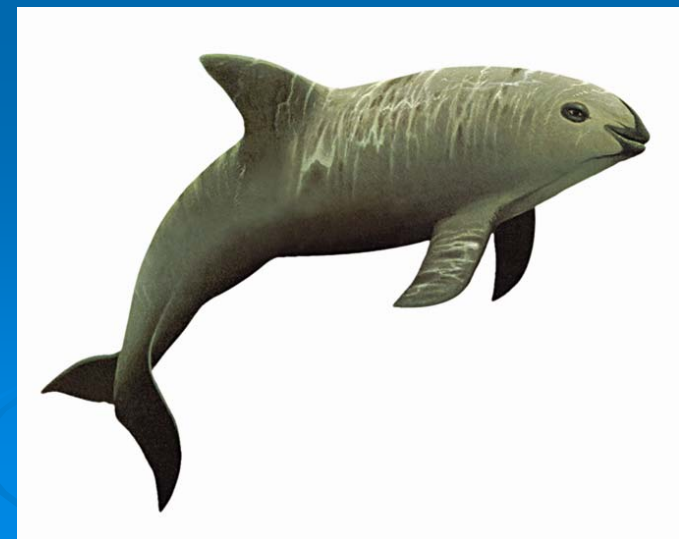
# Scenario 3: Powell's Prophecy (cont'd)

- Water efficiency projects in Mexico
- Base and pulse flows for the Delta
- Recovery of estuarine conditions and indigenous communities
- Delta becomes a model for restoration worldwide



# Scenario 4: A Delta and Estuary Once More

- Growing recognition of the importance of biological and cultural diversity
- New research on freshwater flows and endangered species in the Upper Gulf
- US Supreme Court intervenes to apply ESA
- US and Mexico embark on ecosystem-based management of the river



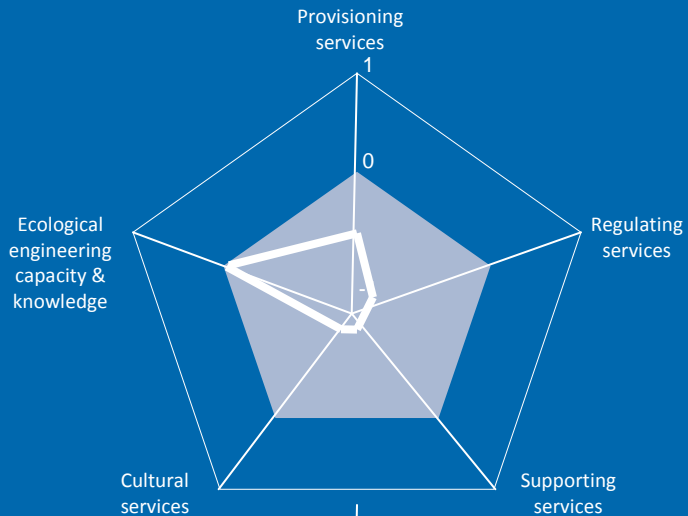
# Scenario 4: A Delta and Estuary Once More (cont'd)

- Environmental assessment per af
- Best practices in cities and agriculture
- Development of regional water conservation goals
- Fisheries thrive and endangered species recover in the Upper Gulf
- Communities and ecotourism flourish in the Delta

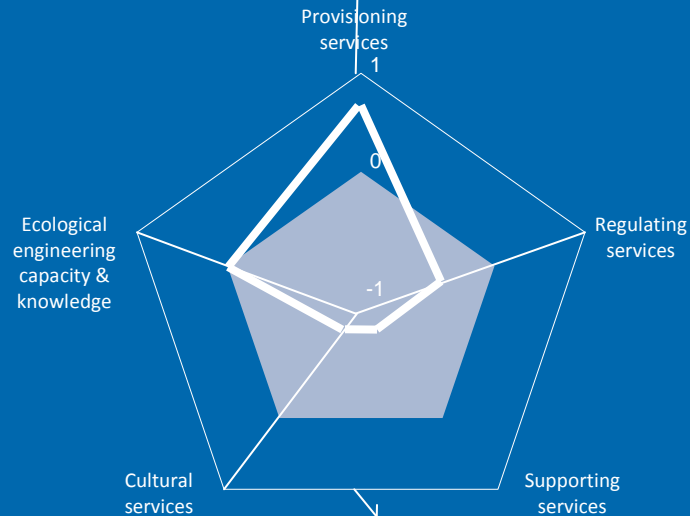


# Scenario Trade-offs

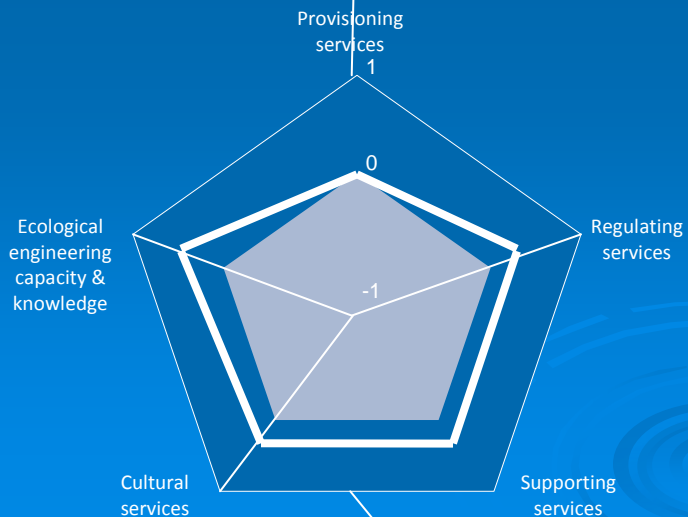
## Dry Future



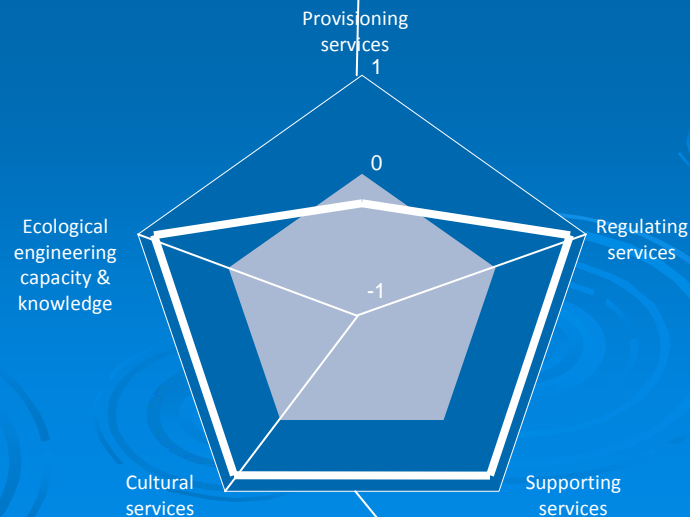
## The Market Rules



## Powell's Prophecy




## A Delta and Estuary Once More





# Recommendations

- Extend ICS
  - Dedicate base and pulse flows to Delta ecosystems
  - Encourage water conservation in agriculture and cities
  - Create mechanisms to safeguard rural communities
- 
- The background of the slide features a blue gradient with several concentric white circles of varying sizes, resembling ripples on water, located primarily in the lower half of the image.



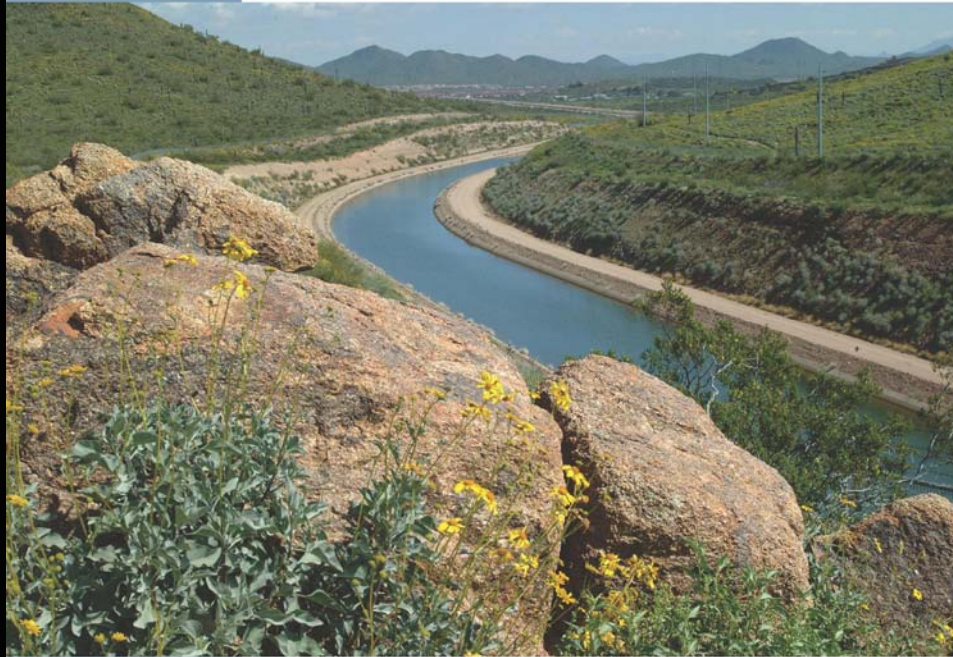
I would love to live  
Like a river flows  
Carried by the surprise  
Of its own unfolding

John O'Donohue



THE UNIVERSITY OF ARIZONA.

# Water Resources Research Center College of Agriculture and Life Sciences



The University of Arizona



## The Importance of the Colorado River to Arizona's Future

June 24, 2008  
Phoenix, Arizona

