

Water Resource Policy and Climate Change: Future Challenges

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What is the answer to the ultimate question?

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(From The Hitchhiker's Guide to the Galaxy)



In Google Scholar:

How many hits do you get for “climate change”?

1.19 million

“water policy” 45,700 results

“climate change” and “water policy” 470



Projected Climate Change Impacts:

Temperature

- Average air temperature warmer
- Greater warming for winter, nighttime minimum temperatures
- More episodes of extreme heat
- Fewer episodes of extreme cold
- Longer frost-free period

Precipitation

- Changes in average precipitation are uncertain, could increase or decrease
- More extreme events (torrential rain, severe droughts)
- Continuation of historical patterns of wet and dry cycles, including likely recurrence of multiyear drought (like 1950s)
- Winter rain instead of snow at all but highest elevations



How do we incorporate this into management?

- Gather data
- Build models
- Offer policy prescriptions



Problems we've faced without climate change?

- Increasingly scarce water resources
- Increasing Demand (market and non-market)
 - Economic growth
 - Population growth
- Drought
- Infrastructure
- Allocation



What have we solved?

- New Resources (conserved resources)
- Integrated planning
 - water, energy, economic growth,...
- Drought measures and policies
- DSM



What have we solved?

- Population Growth

State	1980-1990	1990-2000	2000-2009
Idaho	6.7%	28.5%	19.5%
Nevada	50.1%	66.3%	32.3%
New Mexico	16.3%	20.1%	10.5%



What have we solved – Infrastructure?

ASCE 2009 Report US Infrastructure Grade - D

State	Water Infrastructure (\$ million)	High Hazard Dams (HHD)	Dams in need of Rehabilitation	Wastewater Infrastructure (\$ million)
Idaho	\$727	107	9 of 569	\$444
Nevada	\$912	165	27 of 744	\$246
New Mexico	\$922	181	167 of 398	\$160



Some of our focuses

- Timing and use of water
- Risk and uncertainty
- Alternative or traditional water systems
- Resilience of systems
- Constraints and rules
- Use (ag, urban, ind., commercial)
- Lease and sale systems



What are the challenges?

- Decreasing \$'s
- Increasing Needs
- Increased complications to water management due to climate change; non-market goods; urban/rural conflicts; social/cultural disagreements
- Potentially antiquated compacts
- Inadequate water trade systems
- Rigidity in the system and in the agents
- Rigidity in researchers
- Rigidity in the policymakers



What are the challenges?

Water systems are complex. Physical and human interactions shape the system and shape future possibilities of that system. Without a focus that considers the factors simultaneously, our results may provide answers that are at best incomplete and at worst, misleading.



What is the challenge?

Arriving at the right set of questions.



**“The American West was won by water management.
What happens when there's no water left to
manage?”**

National Geographic, February 2008

