Utilizing Sustainability and Equity Criteria to Evaluate River Basin Decision-Making: A Case Study from the Colorado River Basin

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Outline

- Motivation
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- Methods
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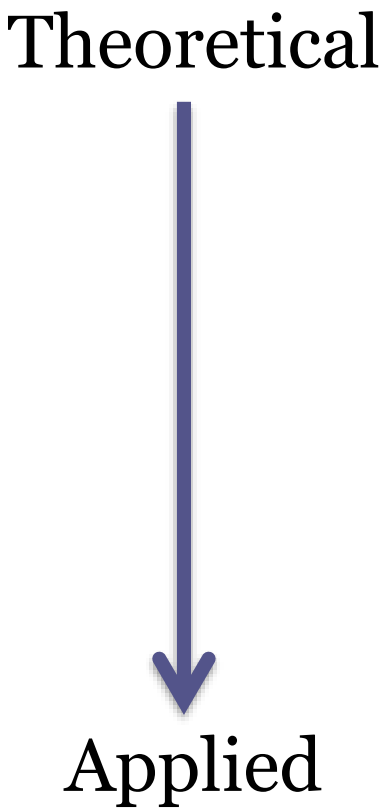
- Conclusions (preliminary)
- Next steps



Motivations

- Numerous vulnerabilities throughout water systems
  - *Increasing demands, changing demands, climate variability and change, drought, etc.*
  - *Complexity of regional hydrologic cycle change*
- Numerous reforms to reduce risk have been proposed
  - *Flexibility*
  - *Adaptive capacity*
  - *Integration of science and policy*
  - *Collaboration*
  - *Holistic approaches*

Motivations

- Existing water institutions
  - *Seemingly inherent inflexibility, conservatism, and rigidity?*

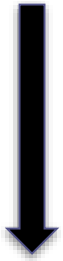
"The system has a lot of inertia and does not readily admit change." (Leshy 2009 p. 139)

"…change is impeded due to the strong interconnectedness of factors stabilizing current water management regimes." (Pahl-Wostl 2007, p. 61)

Thus any proposed institutional change may be confronted with barriers, and the reforms needed may be hindered by the nature of water institutions

Research questions

- Need for reform ----------Inherent rigidity?



How can sustainable water policy bridge the gap and ultimately be identified and analyzed?

What criteria are needed for evaluating sustainability or equity at the basin-scale?

Methods – Literature Review

- Found 37 criteria
  - Participation
  - Governance
  - Fairness
  - Credibility
  - Social capital
  - Etc.

- Grouped into eight categories (Gibson et al. 2005)
  - Socio-ecological system integrity
  - Livelihood sufficiency and opportunity
  - Intragenerational equity
  - Intergenerational equity
  - Resource maintenance and efficiency
  - Socio-ecological civility and democratic governance
  - Precaution and adaptation
  - Immediate and long-term integration

Methods – Decision Analysis

- Systematically examined decisions using each of the eight categories and associated criteria
- 117 primary questions with 122 secondary questions, for a total of 239 questions for each decision

Q50a: If so, what specific methods or tools are discussed (e.g., education, water pricing)?	Q50b: Are there specific benchmarks for demand (e.g., GPCD)?	Q51: What stakeholders were involved in the decision-making process?	Q51a: Were any non-government groups?	Q51b: What levels of government were included?	Q51c: When was each stakeholder group included in the process?	Q51d: How were each stakeholder group's inputs incorporated into the outcome?	Q51e: What were the sizes of each stakeholder group?
The specific methods for California reducing its Colorado River demand are irrigation efficiency upgrades in IID and CVWD, and lining portions of the All-American and Coachella Canals. MWD and SDCWA are the primary sources of funding for these conservation measures, as they would receive portions of the conserved water.	The only benchmark is for California to reduce its Colorado River demand to 4.8 MAF by 2015 and 4.4 MAF by some point after that.	The Bureau of Reclamation, the National Park Service, and the International Boundary and Water Commission prepared the EIS. Representatives from each of the seven Basin states worked together to create three alternatives considered in the EIS. California proposed one alternative, the remaining six Basin states proposed another, and then the seven Basin states submitted a final alternative, which became the preferred alternative. A consortium of environmental NGOs, led by the Pacific Institute, submitted an alternative that was included in the EIS, but ultimately not analyzed as a potential alternative. The US consulted with Mexico regarding potential impacts in Mexico due to the Surplus Criteria, but ultimately took the official stance that the US does not bear responsibility for environmental impacts in other countries, and that Mexico is autonomous in it's use of water once it crosses the international border. Further, the US claimed that the issues Mexico was bringing up were not related to the Surplus Criteria. As such, "[i]ssues not arising from interim surplus criteria are outside of the scope of this FEIS" (Bureau of Reclamation, Colorado River Interim Surplus Criteria FEIS, p. 3.16-2). According to King et al. 2014, "the 2001 Interim Surplus Guidelines were a significant disappointment to Mexico. From Mexico's perspective, they represented a unilateral action by the United States that was undertaken without meaningful input or consultation with Mexico,	Yes. Some environmental and tribal groups were included in the process. Their primary role was during the EIS process, through the submission of comments and alternatives (e.g., Pacific Institute alternative).	Primarily federal and state level government agencies were involved. Some local/regional municipalities and utilities were also involved.	Early in the negotiations (i.e., 1996) only the States, Feds, and prominent water agencies (e.g., MWD, IID) were involved in the decision-making process. Environmental representatives, Mexico representatives, and others were not formally included until the formal EIS process. The late Tom Graff, then Regional Director in California for the Environmental Defense noted, "fast-forwarding, here we are today with a 4.4 plan, a quantification settlement agreement, and surplus criteria, and we haven't got a clue what to do about the Salton Sea, about the Colorado River Delta, about those in Imperial Valley who may be harmed by fallowing, or even about the inevitable need to negotiate with Mexican interests over a whole range of Colorado River related problems and opportunities. We have consensus and benefits accruing to the seven states and the southern California interests, but the other interests are now scrambling to be recognized" (Colorado River Project Symposium Proceedings, 2002, p. 19). Further, the main involvement by the tribes was filing comments on Reclamations DEIS, after the alternatives had been developed. Reclamation did meet and consult with some environmental groups after the DEIS was completed to get their input. For example, senior Reclamation staff met with several environmental groups in December of 1999. One of the outcomes of this meeting was Reclamation requested that the Pacific Institute craft an interim surplus criteria	The seven Basin states inputs were incorporated into the various alternative proposals in the EIS. The National Park Service helped with potential impacts of the Surplus guidelines on resources within the NPS purview. Mexico expressed some concerns regarding the Surplus Guidelines, but ultimately their input was not directly incorporated into the decision. Similarly, some tribes expressed concerns and submitted comments, but their inputs were also not directly incorporated into the decision. The environmental groups submitted an alternative to the EIS process ("Pacific Institute Alternative"), but it was ultimately not included as one of the final alternatives to be considered. Reclamation did not consider this alternative because they argued it "mirrors the Six States Alternative which was analyzed in depth." Further, Reclamation stated that "[t]he portion of the Pacific Institute proposal calling for delivery of water to the Gulf of California is not within the purpose and need for the action and thus not analyzed" (FEIS, Volume[3], Responses and Comments, p. 0-22).	Each of the seven Basin states had contingency representing their interests and submitting inputs and comments to the process. The tribes were represented by the Ten Tribes Partnership. Mexico's interests were represented by their staff at the IBWC. The environmental contingent included the Pacific Institute, American Rivers, Defenders of Wildlife, Environmental Defense, Friends of Arizona Rivers, Glen Canyon Institute, Grand Canyon Trust, Land and Water Fund of the Rockies, Sierra Club Colorado River Task Force, and the Sonoran Institute.
There are four types of ICS Contractors can undertake: 'Extraordinary Conservation ICS' which is things like land fallowing, canal lining, and desalination. 'Tributary Conservation ICS' is where a Contractor can purchase pre-1929 water rights on Colorado River System tributaries within the Contractor's state. 'System Efficiency ICS' is where a Contract may contribute "capital" to the Secretary to use to improve efficiences in the Colorado River System. 'Imported ICS' is where a Contractor brings in non-Colorado River System--but water within that Contractor's state--to contribute to the mainstem of the Colorado River.	No, rather there are limits on the amount of ICS that can be created in each Lower Basin State.	The Bureau of Reclamation, with assistance from the Bureau of Indian Affairs, Fish and Wildlife Service, National Park Service, Western Area Power Administration, and the US Section of the International Boundary and Water Commission developed the EIS. Prior to the EIS process, representatives of the seven Basin States were negotiating a proposal for shortage guidelines. And then during the EIS process there were numerous agency/organization meetings, public conferences and public meetings, sponsored by either the agencies/organizations or Reclamation. The general public was involved in some of those meetings, as well as during the public comment period upon release of the DEIS and FEIS. Various Tribal entities were consulted with by Reclamation (Table 6.9-1 of the FEIS lists all the tribes). State and local water and power agencies were also consulted with by Reclamation. The seven Basin States developed a "Seven Basin States" shortage guideline proposal, which eventually became the "Basin States Alternative" in the FEIS. A group of NGOs also developed a shortage guideline proposal, which eventually became the "Conservation Before Shortage Alternative" in the FEIS. This consortium included Defenders of Wildlife, Environmental Defense, National Wildlife Federation, The Nature Conservancy, Pacific Institute, Sierra Club, Sonoran Institute, and Rivers Foundation of the Americas. Through the USIBWC, several Mexico agencies were consulted throughout the EIS process.	Yes, there was a group of NGOs who were actively involved in developing a proposal. This consortium included Defenders of Wildlife, Environmental Defense, National Wildlife Federation, The Nature Conservancy, Pacific Institute, Sierra Club, Sonoran Institute, and Rivers Foundation of the Americas. Mike Cohen, of the Pacific Institute, noted in 2011, "many in the conservation community are very pleased with the Seven States Agreement. It was an inclusive process. The many members of the conservation community were very active in that and I think we're welcome to participate at least at some level. We put a lot of ideas out there. I like to think some of them were adopted in that. I think that was a good model for moving forward. There was strong leadership. There was direction to move forward. Different ideas were welcome and were evaluted in full, and evaluted on their merit not simply by who is submitting them" (Colorado River Project Symposium Proceedings, 2011, p. 69). King et al., 2014, notes that, "The Guidelines also reflected a changing posture between US water users and the major environmental NGOs, who collaborated closely with other US stakeholders and the Bureau of Reclamation in the development of the Guidelines, reversing a long history of arms-length, litigation-driven relationships between environmental and water user interests. As a result, NGOs developed one of the alternatives considered in the Draft and Final EIS documents and provided significant input into	In the United States federal, state, and local governments were included--at least consulted--during the EIS process. In Mexico, only federal governments were consulted.	Early on in the process (pre-EIS), it was primarily representatives of the seven Basin states negotiating potential shortage sharing guidelines. Once the EIS officially began, the environmental NGOs developed their proposal and the other stakeholder groups (e.g., tribes, Mexico) were consulted. The general public was also consulted, and comments solicited, during various public meetings and the public comment period. Section 6.2 of Chapter 6 of the FEIS goes into detail regarding public meetings (time, location, etc.).	During the scoping phase of the NEPA process over 1100 written comments were received from the public. These comments led to three considerations that were included in the shortage guidelines: "(1) the importance of encouraging conservation of water, particularly during times of drought; (2) the importance of considering reservoir operations at all operational levels, not just when reservoirs are low; and (3) the importance of establishing operational guidelines for a finite (interim) period to gain valuable operational experience to inform future management decisions" (Jerla et al., 2011, p. 433). The cooperating federal agencies inputs were incorporated into the EIS in regards to potential environmental impacts within their purview (e.g., NPS, BIA, FWS, WAPA). Large parts of the Basin States Alternative was included in the Preferred Alternative. Parts the environmental consortium's Conservation Before Shortage Alternative were also included in the Preferred Alternative. The consortium initially submitted the Conservation Before Shortage proposal in July 2005, but then after seeing the States reach consensus on a broader set of guidelines (including coordinated operations of Lakes Powell and Mead), the consortium resubmitted an updated proposal (Conservation Before Shortage II). This updated proposal included some of the States proposal, namely the ICS, although the consortium proposed expanding the ICS to users in Mexico. Although Mexico was consulted throughout the EIS	Each of the seven Basin states had contingency representing their interests and submitting inputs and comments to the process. Eleven different tribes submitted official comments to the FEIS. Mexico's interests were represented by their staff at the IBWC. The environmental contingent included the Defenders of Wildlife, Pacific Institute, Environmental Defense, Sierra Club, National Wildlife Federation, Sonoran Institute, The Nature Conservancy, and Rivers Foundation of the Americas. Reclamation spearheaded several collaborations with academic and private researchers to support the decision-making process. One such collaboration was with the University of Arizona and University of Colorado to improve Reclamation's understanding of water supply variability through the improved use of proxy data (e.g., tree-ring studies), which allowed for an improved ability to represent future flows in the Colorado River Basin system. Another collaboration was the development of a Climate Technical Work Group to assess the current state of scientific knowledge in regards to climate change impacts, both current and projected, in the Colorado River Basin. As noted by Jerla et al. 2011, "Each of these collaborations and Reclamation's modeling capabilities were instrumental in developing the latest addition to the Law of the River: the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead" (p. 431).
The ICMA program is for conservation projects (e.g., canal lining) or new water source projects.	No, but there are limits on the amount ICMA that can be created by Mexico (i.e., 250,000 acre-feet).	"Reclamation is a key operations and technical partner for the U.S. IBWC, while Mexico uses CONAGUA" (Colorado River Project Symposium Proceedings, 2011, p. 95). "Beginning in early 2011, discussions recommenced among Reclamation, the Basin States, US water agencies, NGOs, the IBWC, CILA, Mexico, CONAGUA, and other Mexican stakeholders in search of a comprehensive, cohesive agreement" (King et al., 2014, p. 89). The US water agencies included MWD, SNWA, and CAWCD. The NGOs included the Sonoran Institute, Pronatura Noroeste, A.C., the Environmental Defense fund, The Nature Conservancy, and the Redford Center. Additional Mexico stakeholders included SEMARNAT, Mexico's Secretary of the Environment and Natural Resources.	As Bob Snow noted in 2013, "Minute 319 could not have been completed without the participation and funding from the Basin states and the participation and funding of the NGOs" (Colorado River Project Symposium Proceedings, 2013, p. 26). "Although NGOs were not included in all of the negotiating sessions--some were conducted on a purely sovereign-to-sovereign basis (or at least nearly so)--NGOs participated throughout the process in a manner that is nearly unprecedented in the Colorado River Basin, sitting 'at the table' for much of the process and chairing or co-chairing many of the relevant working groups. Perhaps even more importantly, NGOs have helped to implement Minute 319 by providing many resources necessary for its implementation. NGOs and their retained experts have participated in most facets	Local, state, and federal of both the US and Mexico.	Towards the end of the negotiating process, as both countries were going back and forth with various proposals, a series of meetings were held that included an increasingly smaller group of stakeholders. "Initially, these final negotiations included a group of 'key stakeholders', which was roughly the same group that had been there at the beginning of the negotiations ("IBWC, Reclamation, a few key individuals from the Basin States and major water providers, and an NGO representative; Mexico's representative group consisted of CILA, CONAGUA, and NGOs" (King et al., 2014, p. 91)). At this point, however, the "US NGOs were not permitted to directly participate in the final negotiating sessions on the basis that only "sovereign" entities should participate in those negotiations" (King et al., 2014, p. 91). The	Each of the stakeholder group's inputs were incorporated into the decision in a variety of ways. Mexico's desire to be able to continue to store water in the US, use stored water against future deliveries during shortages, share in surpluses in addition to shortages, include environmental protection, and overall have a more binational approach to management were all included into the decision. Mexico also got support (in the form of proposed funding) for a variety of new supply projects, including desalination plants. The US and the Basin states got Mexico to agree to specific shortages given certain elevation levels in Lake Mead. The water agencies were able to increase supplies through ICMA to ICS programs. The NGOs goal of having dedicated environmental flows was incorporated into the	"Initially, these final negotiations included a group of 'key stakeholders', which was roughly the same group that had been there at the beginning of the negotiations (IBWC, Reclamation, a few key individuals from the Basin States and major water providers, and an NGO representative; Mexico's representative group consisted of CILA, CONAGUA, and NGOs" (King et al., 2014, p. 91)).

Methods – Survey

- Asked stakeholders their perceptions and opinions on Colorado River Basin decision-making
  - Questions regarding views on participation, transparency, trustworthiness, equity, and sustainability
  - Questions about the Law of the River, specifically if (and how) it needs to be modified to handle existing and future problems
    - Also -- what constitutes a change to the Law of the River?

Methods - Survey

- Sent to ~1,000 Colorado River Basin stakeholders throughout the United States and Mexico

- To date—approximately a 16% response rate

Preliminary Results

- Participation
  - Informal negotiations and trust building among decision-makers
    - For example, in 2011 Reclamation hosted IBWC Commissioners on a tour of the Basin

"I must admit that the molé in Salt Lake City was outstanding."

-Commissioner Edward Drusina, IBWC

Preliminary Results

- Participation
  - Approximately 60% of the survey respondents thought that while they are not actually at the negotiating table, people who adequately represent their interests are at the table.
  - 77% of the respondents believed that the people making decisions were trustworthy, but only 40% believed the decision-making process is transparent.

Preliminary Results

- Participation
  - For some groups, involvement has evolved across the three decisions
    - For example, environmental NGOs
      - 2001 Surplus Guidelines – Largely excluded from discussions
      - 2007 Interim Guidelines – More inclusive and parts of the NGOs proposal were included in the final decision
      - 2012 Minute 319 – "Minute 319 could not have been completed without the participation and funding from the Basin states and *the participation and funding of the NGOs*"

        -Bob Snow, Office of the Solicitor, DOI, 2013

Preliminary Results

- Institutions and governance
  - 73% of the survey respondents thought that minor or significant changes to the Law of the River are needed to address current and future problems.
  - 70% of the respondents also thought that addressing the 'structural deficit' would require temporary curtailments.
  - But 67% were also concerned that any new decisions could lead to litigation, which is a significant barrier to institutional change

Conclusions

- Institutions may be more flexible than previously thought.

- How to overcome barriers and address the structural deficit in the Lower Basin?
  - Potential to learn from the Minute 319 process regarding institutional changes.

Conclusions

- “Minute 319's focus on **clearly defined voluntary obligations…** avoided conflict concerning the parties' various and conflicting interpretations of the 1944 Water Treaty's ambiguous language… the Minute adopted these solutions as part of a **voluntary program overlaying the provisions of the Treaty (rather than purporting to interpret it)**. By so doing, **the Minute allowed the parties to preserve their legal positions with regard to the language interpretation of the Treaty itself**, while sidestepping the need to resolve those conflicts in advance of more effective collaboration on binational river management” (King et al., 2014, p. 107-8).

Conclusions

- Participation?
  - 35% of survey respondents felt like they have an adequate seat at the negotiating
  - 62% of survey respondents felt like while they're not at the actual table, people who are adequately representing them are
  - Only 26% do not feel involved at all in negotiations.

Conclusions

- The importance of ongoing negotiations?
  - Minute 32X
    - 74% very or extremely important
  - Lower Basin Drought Contingency Planning
    - 87% very or extremely important
  - Expansion of the System Conservation Program
    - 65% very or extremely important

Conclusions

- Final thought on how equity and sustainability in the Colorado River Basin?
  - The majority of survey respondents thought it IS equitable, but an even greater majority thought it is NOT sustainable.

Next steps

- In-depth interviews with key Colorado River Basin managers

- Article submission as part of Regional Environmental Change, Special Issue: *Water Governance in Federal Rivers—Building Resilience to Drought and Water Scarcity*

Thank you!

Questions or comments?

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