DOI Climate Science Centers

Indigenous Peoples' Climate Change Working Group

Adaptation to Climate Change and Variability: Bringing Together Science and Indigenous Ways of Knowing to Create Positive Solutions

WATER QUALITY AND QUANTITY

Over seventy participants of *Rising Voices* convened for a second time at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado on June 30-July 2, 2014 to discuss what the science, information, support and research needs are of tribal communities to facilitate respectful and appropriate adaptation solutions to climate change and variability. *Rising Voices* is a community of engaged Indigenous leaders, Indigenous and non-Indigenous environmental experts, students, and scientific professionals across the United States, including representatives from tribal, local, state, and federal resource management agencies, academia, tribal colleges, and research organizations.

We came together from across the nation – including Hawai'i and Pacific Islands, Alaska, Northwest, Southwest, the Plains, Midwest, Gulf states, and Northeast – for a rich and honest discussion regarding the complex climate change challenges facing Indigenous peoples, current adaptation and mitigation strategies, protection of Indigenous knowledge, sustainable Indigenous practices, and political and institutional barriers. Many of the Indigenous communities represented at *Rising Voices* are already contending with a changing climate, including displacement of Native Alaskan villages and Native Gulf Coast communities due to rising sea levels, loss of sea ice, and/or extreme hurricane activity.

Some of the key problems facing water quality and quantity relate to availability, including availability for natural ecosystems and for human use. In addition to climate change, some of the other stressors affecting availability include population growth in arid environments and Western water law, which allows for the extraction of water from streams and groundwater as a property right less easily modified than a permit, hindering allocation and re-allocation to streams to maintain ecosystem function. In the United States, there is a false sense of water availability and generally, people do not realize it is a limited resource. For example, despite ice melting in the Shoshone wilderness, which creates a water debt and means that there will not necessarily be water to count on when people need it, many people still do not believe there will be that loss. Yet, seasons and recharge rates are changing and we can no longer rely on a stationary climate.

There are a number of policy and management issues for Indigenous-related water quality and quantity concerns; among them:

- Water management is intrinsically linked with sovereignty issues – land, food, and knowledge.
- Managing water from Indigenous perspectives is about relationship with place, which can be difficult for non-Indigenous people to understand. The Indigenous perspective is that we do not own any of our lands, but we steward them; this brings a different kind of evaluation and metric to the process.

- Multiple actors with varying interests and diverse sense of values are involved in the water sector with "invisible" politics influencing the decision-making process. For example, extractive industries remain the loudest voices and deepest pockets on water resource boards. The Bureau of Indian Affairs plays a huge role in whether a particular tribe gets water allocations.
- There is a disconnect between water science and policy, and limited access to information for water managers to make decisions.
- Assumptions cannot be made about a stationary climate, and recharge rates are not known, yet even if this information is available, using quantifications turns water into a commodity. Currently, un-quantified water rights have lower priority than quantified water rights. Indigenous communities might not want to get more involved in ecosystem service conversations if such services are commodified with a price tag.

Some of the urban issues related to water quality and quantity include stormwater and runoff from hard city surfaces with impacts beyond the city limits, such as salmon being affected by dust from brake linings, asbestos, and copper in waterways. Rural and urban issues include water quality (e.g., E. Coli, other coliform contamination) and agriculture to urban water transfers. For example, in Colorado, the energy-seeking industry has played an increasing role in acquisition of water rights for future uses as well as present activities. Another major concern is the effect of water quality and quantity on ecosystems. We need to have an inter-cultural conversation about ecosystem services, in which multiple perspectives inform the understanding of issues, such as how flooding and drought affect ecosystems, and one in which we talk about "eco-relations" instead of "services."

Challenges stemming from these issues include:

- How to frame this in a way that is culturally acceptable and scientifically sound to all of the people, and technically relevant for some management purposes.
- How to readjust historic trust responsibilities with tribal responsibility.
- The need to recognize the value of Indigenous knowledges and to recognize that western science is one among many epistemological and knowledge traditions, sometimes with differing core values, such as replicability of observations.
- The need to encourage the transfer of knowledge about water and water management between generations.
- How to evaluate and measure the management, quality, and quantity of water sources.
- Existing dysfunctions in water management systems in the United States will become increasingly problematic and dysfunctional in the future as climate-related impacts increase.
- Considering whether and how to work within our existing systems or challenge those systems.

Despite these challenges, there are some positive examples of water management and the transfer of knowledge, such as:

- Collaborative efforts, including the Colorado Roundtable process and the Wind River – Crowheart water users collaborative that has regained substantial water management authority from the Bureau of Indian Affairs.
- Colorado and other states use the instream flow programs as mechanisms to help keep some water in the stream for threatened and endangered species.
- The U.S. Forest Service has a written policy to include other sources of knowledge, but the question remains about the effectiveness of this policy and how to build champions on both sides.

- Little Bighorn College started a gardening program that includes helping community members learn about water and hydrology from different perspectives, e.g., scientific, Indigenous, etc. This ties into the Crow Fair, which has been occurring for over 100 years. The government told the Crow people they could not dance and sing, however the people embraced growing vegetables and celebration.

Based on our discussions, we recommend the following:

- ***Water rights*: Establish an institutional framework to ensure support for tribes to define and utilize their water rights.** Tribes need legal, financial, engineering, and scientific support in water rights adjudication, litigation, and settlement, such as financial support to fund infrastructure and engineering and scientific support to adequately quantify available surface and ground water, water use, water use projections, storage/transport options, and infrastructure development. Tribal governments need to participate in timely water settlement deliberations for all uses. An independent review process should be established to provide information on how settlement discussions are progressing and ensure that the kind of support required to facilitate agreement is provided.

- ***Collaboration to Address Climate Change Impacts on Water:* Establish basin-level regional processes for federal, state, local, and tribal governments to develop and implement cohesive strategies for addressing impacts of climate change on water quality and quantity.** Climate change impacts on surface and ground water will profoundly affect human health, public safety, economies, ecological functions, and cultures. Collaboration is needed among a wide variety of tribal, federal, state, regional, and local entities with jurisdiction over water to manage surface and groundwater conjunctively and in an integrated manner and to contend with upstream and downstream impacts of climate change on water.

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